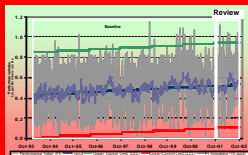


Occurrence Performance Annual Report FY 2002



Incident Investigation



Control Chart Review



Department	Objective	Target	Actual	Status
AD	100%	100%	100%	Green
AS	100%	100%	100%	Green
BE	100%	100%	100%	Green
BS	100%	100%	100%	Green
CC	100%	100%	100%	Green
CE	100%	100%	100%	Green
CH	100%	100%	100%	Green
CI	100%	100%	100%	Green
CM	100%	100%	100%	Green
CO	100%	100%	100%	Green
CS	100%	100%	100%	Green
CU	100%	100%	100%	Green
CV	100%	100%	100%	Green
DE	100%	100%	100%	Green
DI	100%	100%	100%	Green
DM	100%	100%	100%	Green
DS	100%	100%	100%	Green
DT	100%	100%	100%	Green
DU	100%	100%	100%	Green
EA	100%	100%	100%	Green
EB	100%	100%	100%	Green
EC	100%	100%	100%	Green
ED	100%	100%	100%	Green
EE	100%	100%	100%	Green
EF	100%	100%	100%	Green
EG	100%	100%	100%	Green
EH	100%	100%	100%	Green
EI	100%	100%	100%	Green
EJ	100%	100%	100%	Green
EK	100%	100%	100%	Green
EL	100%	100%	100%	Green
EM	100%	100%	100%	Green
EN	100%	100%	100%	Green
EO	100%	100%	100%	Green
EP	100%	100%	100%	Green
EQ	100%	100%	100%	Green
ER	100%	100%	100%	Green
ES	100%	100%	100%	Green
ET	100%	100%	100%	Green
EU	100%	100%	100%	Green
EV	100%	100%	100%	Green
EW	100%	100%	100%	Green
EX	100%	100%	100%	Green
EY	100%	100%	100%	Green
EZ	100%	100%	100%	Green

Scorecard Assignment



Action Development

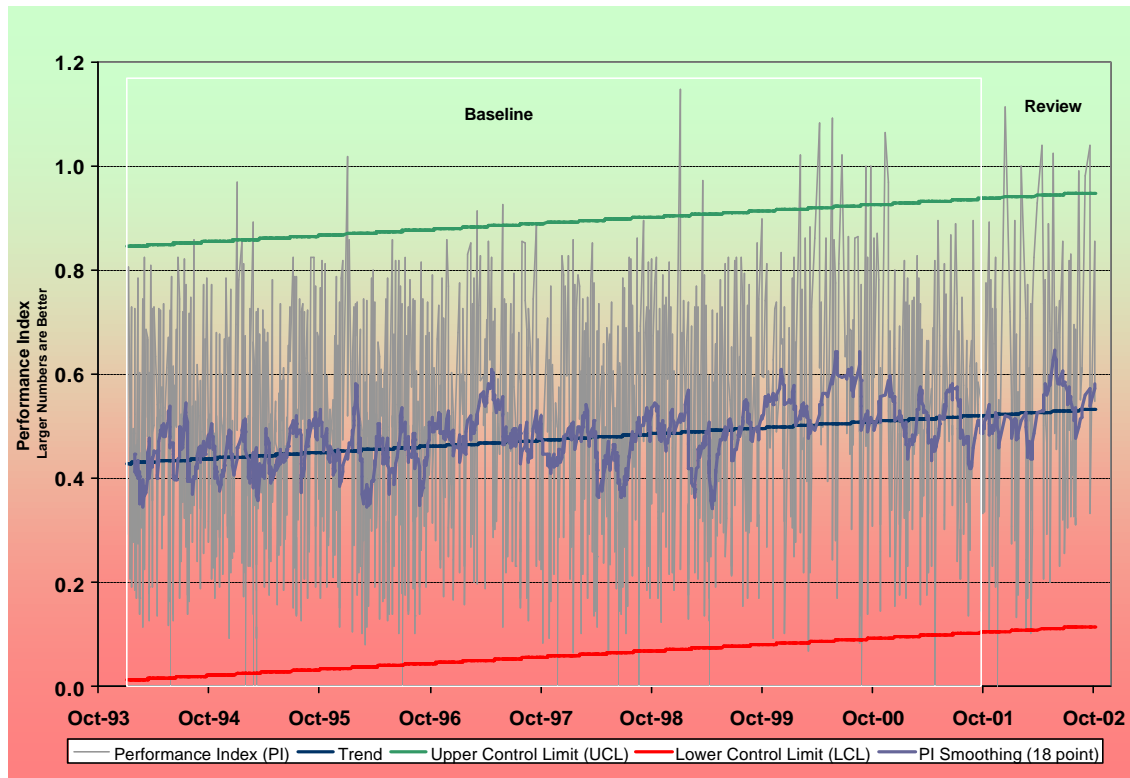
***Fixing LANL's
Problems!***



LANL Overall Review

FY2002

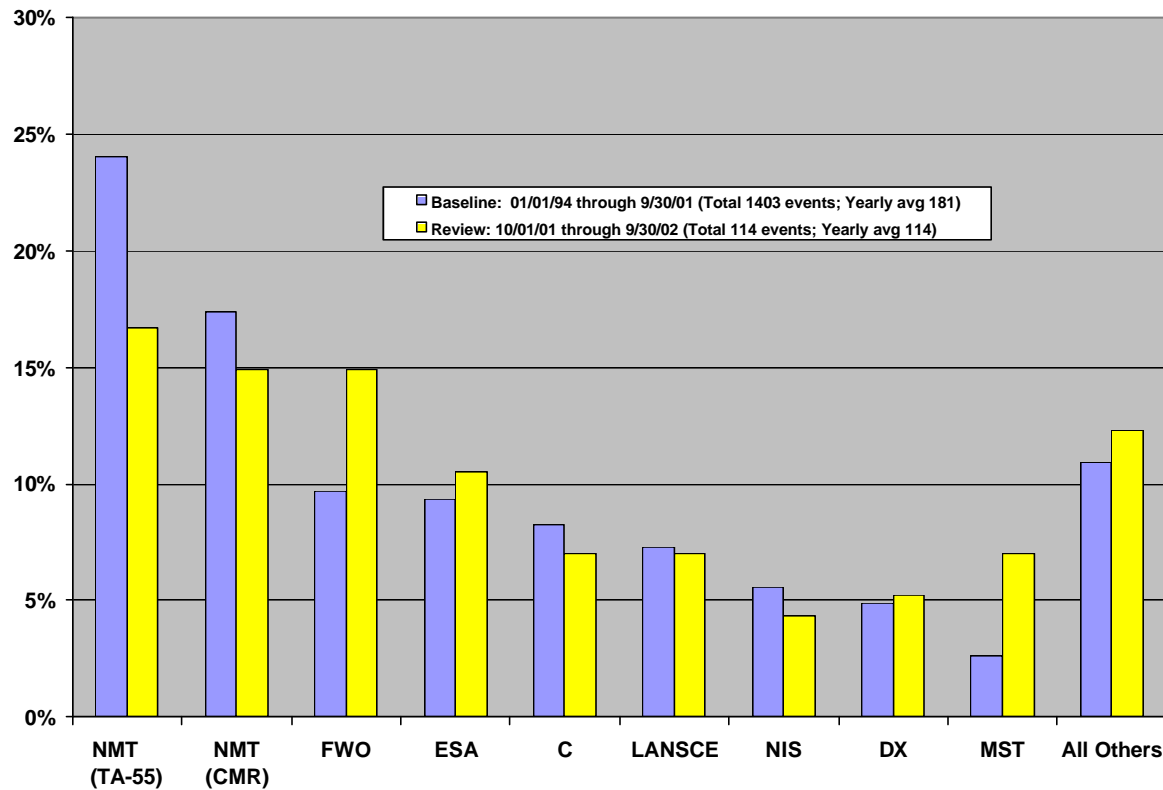
LANL Occurrence Performance



LANL PI Control Chart
01/01/94 to 10/01/02

- Total 1,517 events severity weighted 2, 3, or 4
 - Baseline: 1,403 events
 - Review: 114 events
- Improving performance during baseline period
- Continued improving performance for review period

Distribution of LANL Occurrences—Organizational

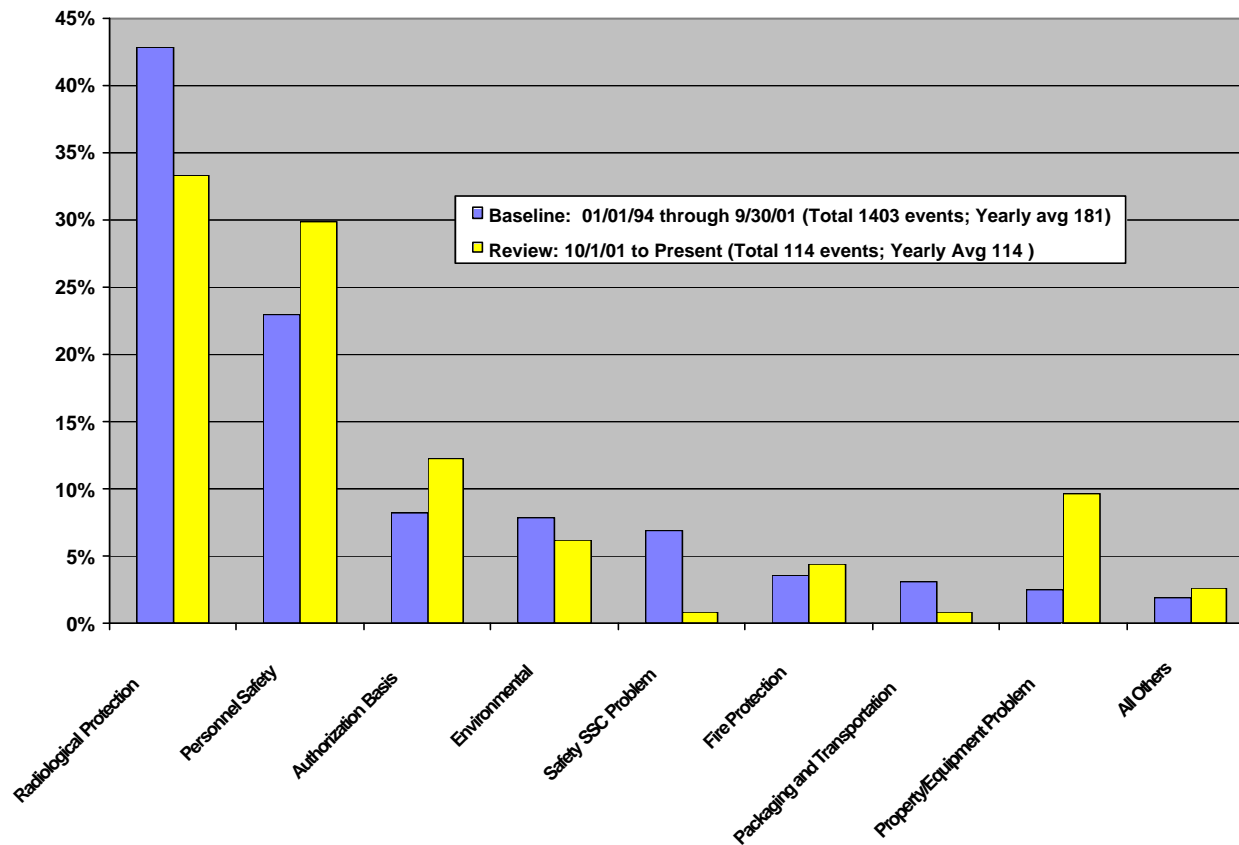


Occurrences by Facility Owner

Baseline vs. Review

- Average annual number of events has dropped from 181 in baseline to 114 in review
- 8 Divisions account for more than 85% of occurrences in review period — NMT, FWO, ESA, C, LANSCE, NIS, DX, MST

Distribution of LANL Occurrences— Safety Function



Occurrences by Type Baseline vs. Review

- Radiological Protection and Personnel Safety predominant types—65% of total in baseline and review
- 4 other types account for 24% of LANL events — Authorization Basis, Environmental, Fire Protection, and Property/Equipment Problem

LANL Scorecard of Occurrence Performance in Review Period

LANL Occurrence PI Scorecard		Radiological Protection	Personnel Safety	Authorization Basis	Property or Equipment Problem	Environmental	Fire Protection
NMT (TA-55)					N/A		
NMT (CMR)					N/A		
FWO							
ESA							
C							
LANSCCE							
NIS							
DX							N/A
MST						N/A	
All Others							

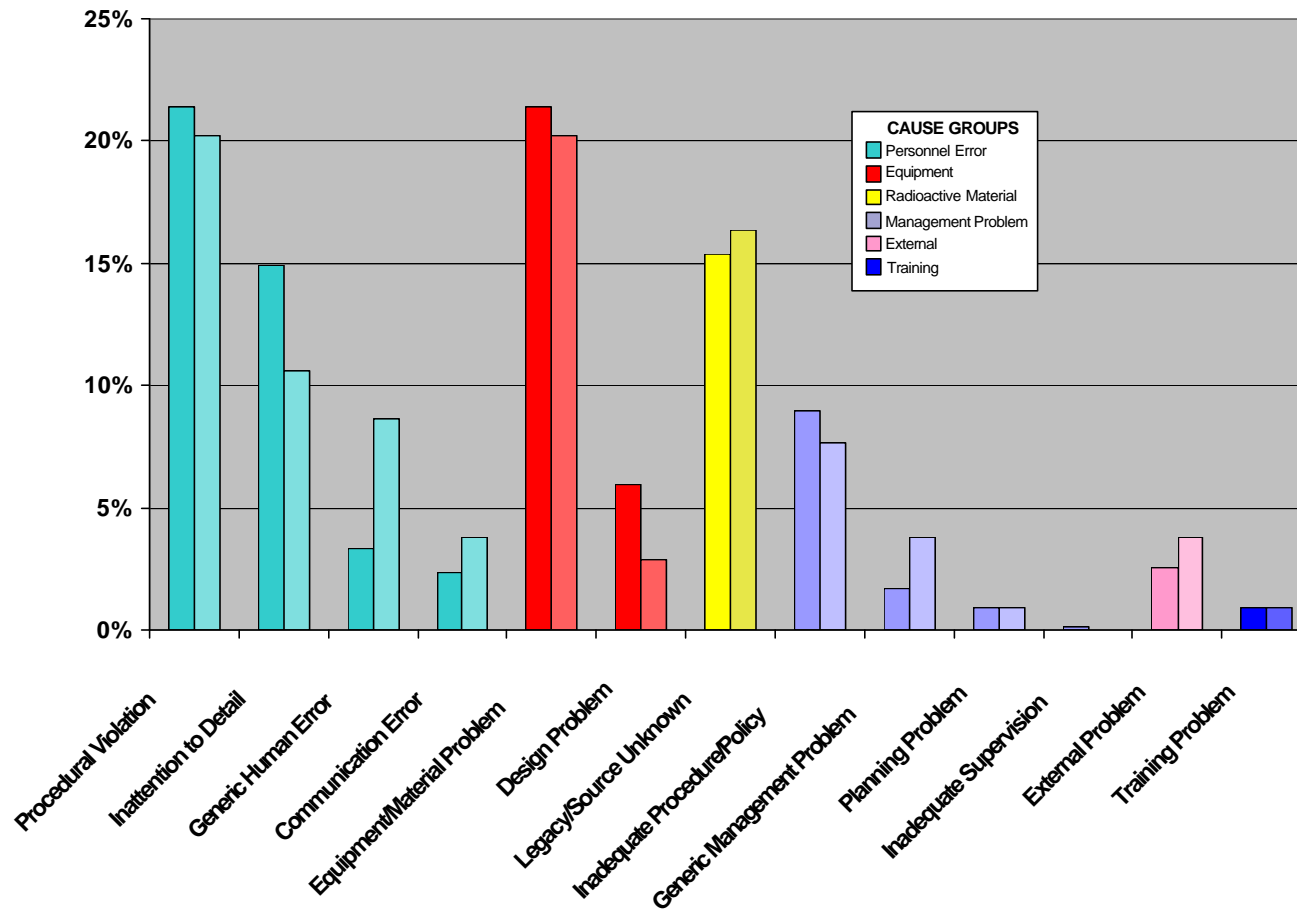
LANL Scorecard

- 4 Organizations and 3 Safety Functions show improving performance during review period
- 6 Organizations and 3 Safety Functions show static or decreasing performance during review period
- [Click on individual icons for detailed breakout](#)

LEGEND

	Improving performance
	Improving performance (limited data)
	Static performance
	Static performance (limited data)
	Declining performance
	No occurrences in baseline or review

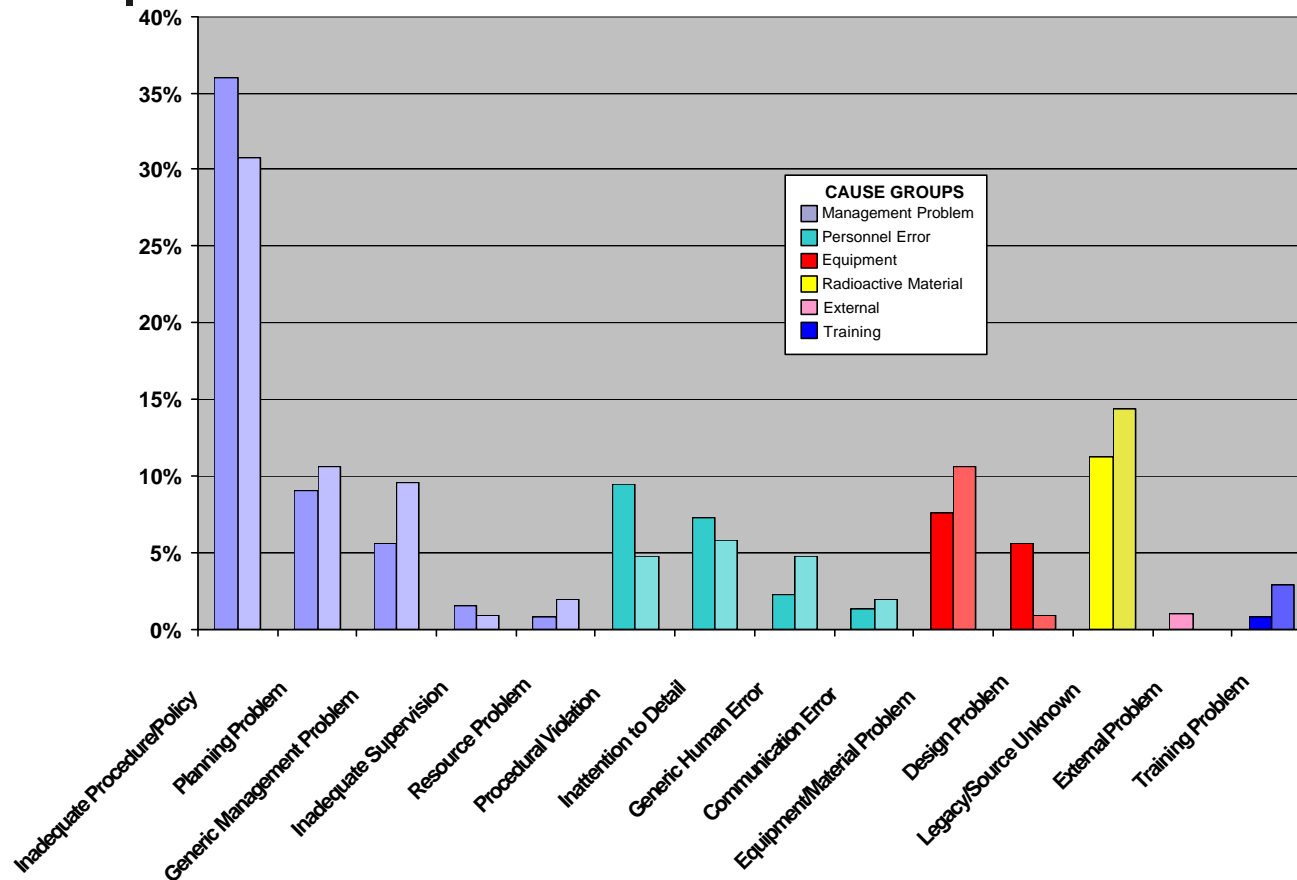
Direct Causes of LANL Occurrences



Direct Causes Baseline vs. Review

- 42% of LANL events identify personnel error as direct cause
- 27% identify equipment problems
- 15% specify legacy or unknown radiological source

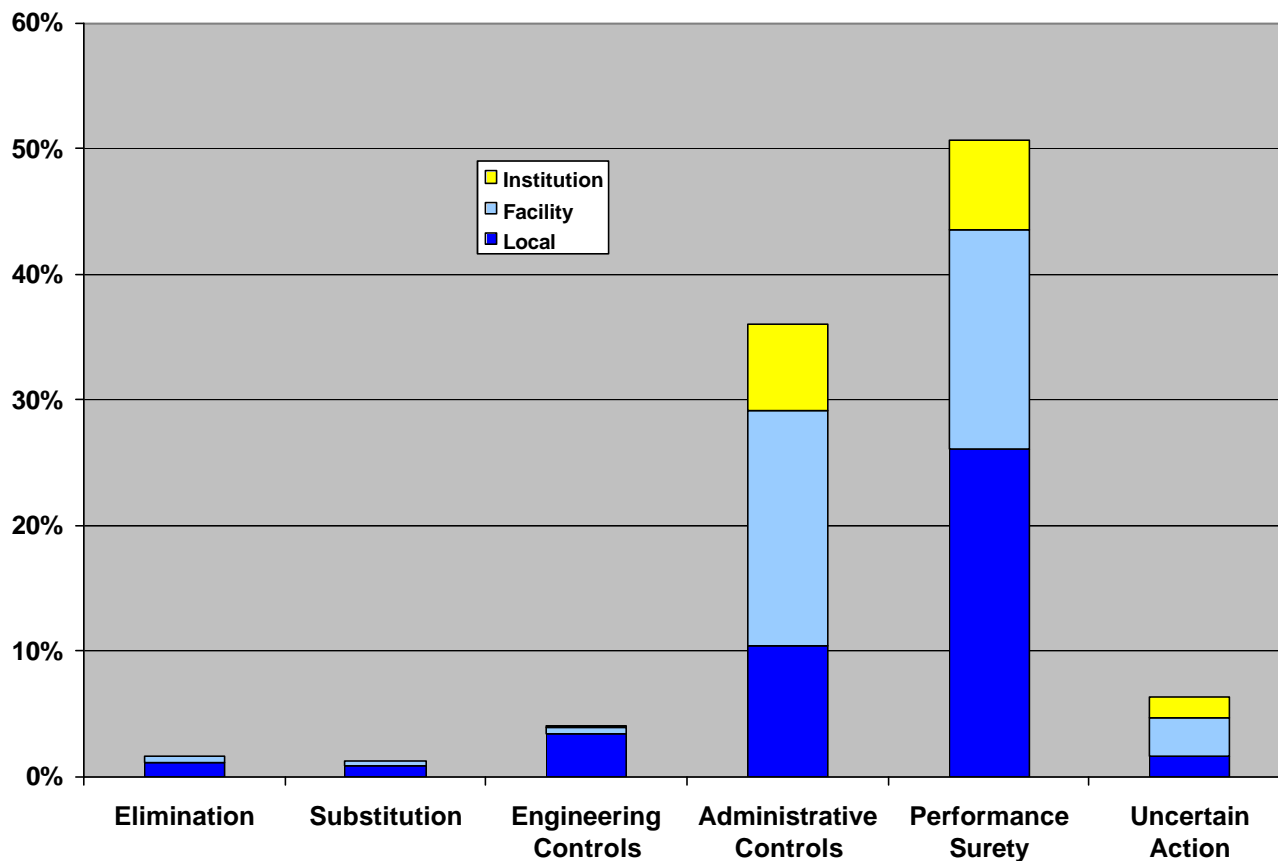
Root Causes of LANL Occurrences



Root Causes Baseline vs. Review

- 36% of events identify inadequate procedures as root cause
- 19% identify personnel error
- 13% identify equipment problems
- 11% identify legacy contamination or unknown source

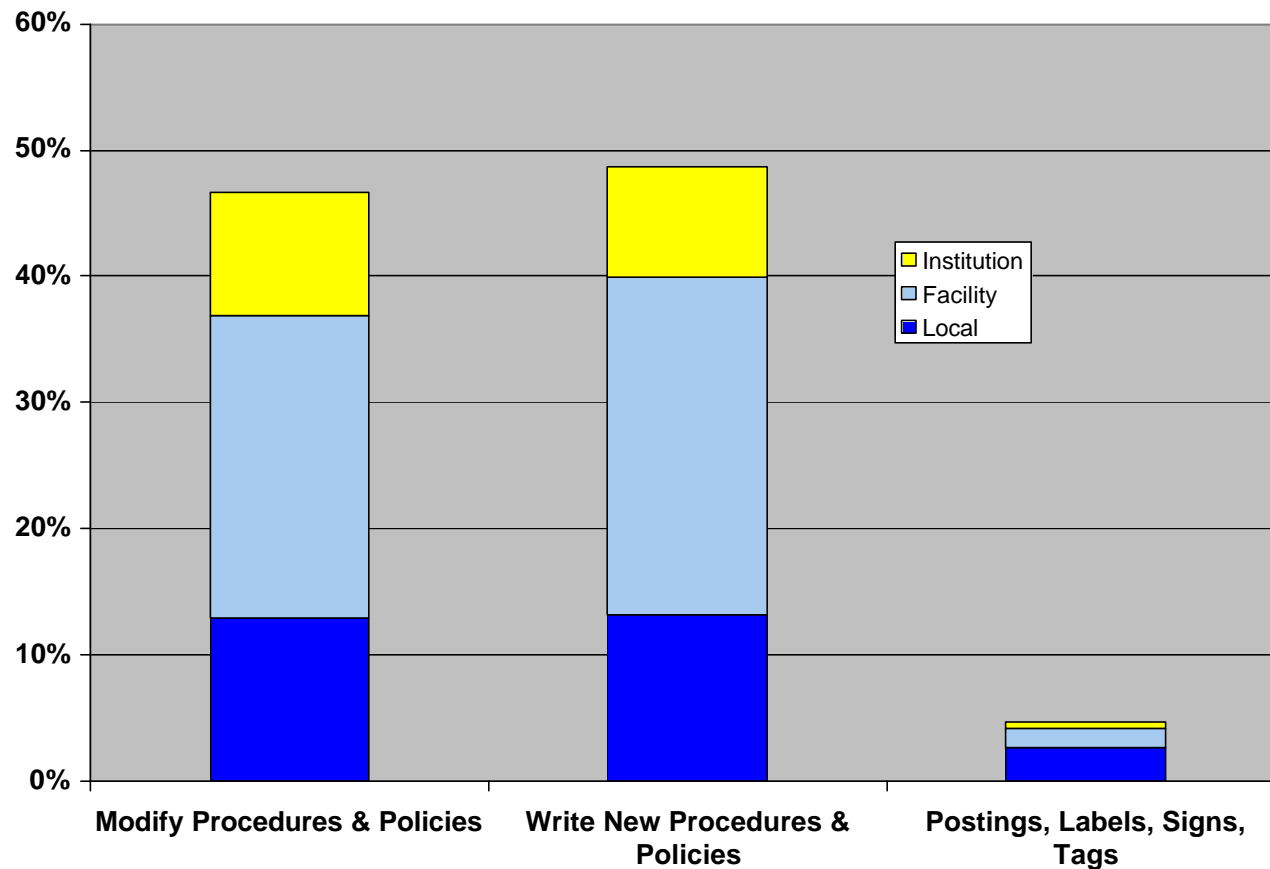
Profile of LANL Corrective Actions



Corrective Actions (10/01/99 to Present)

- Less than 3% of actions target eliminating or substituting for lesser hazard
- Less than 5% specify new or modified engineering barriers
- More than 85% of all actions target procedural changes or "performance surety" actions
- Most actions at facility or local level—16% institutional

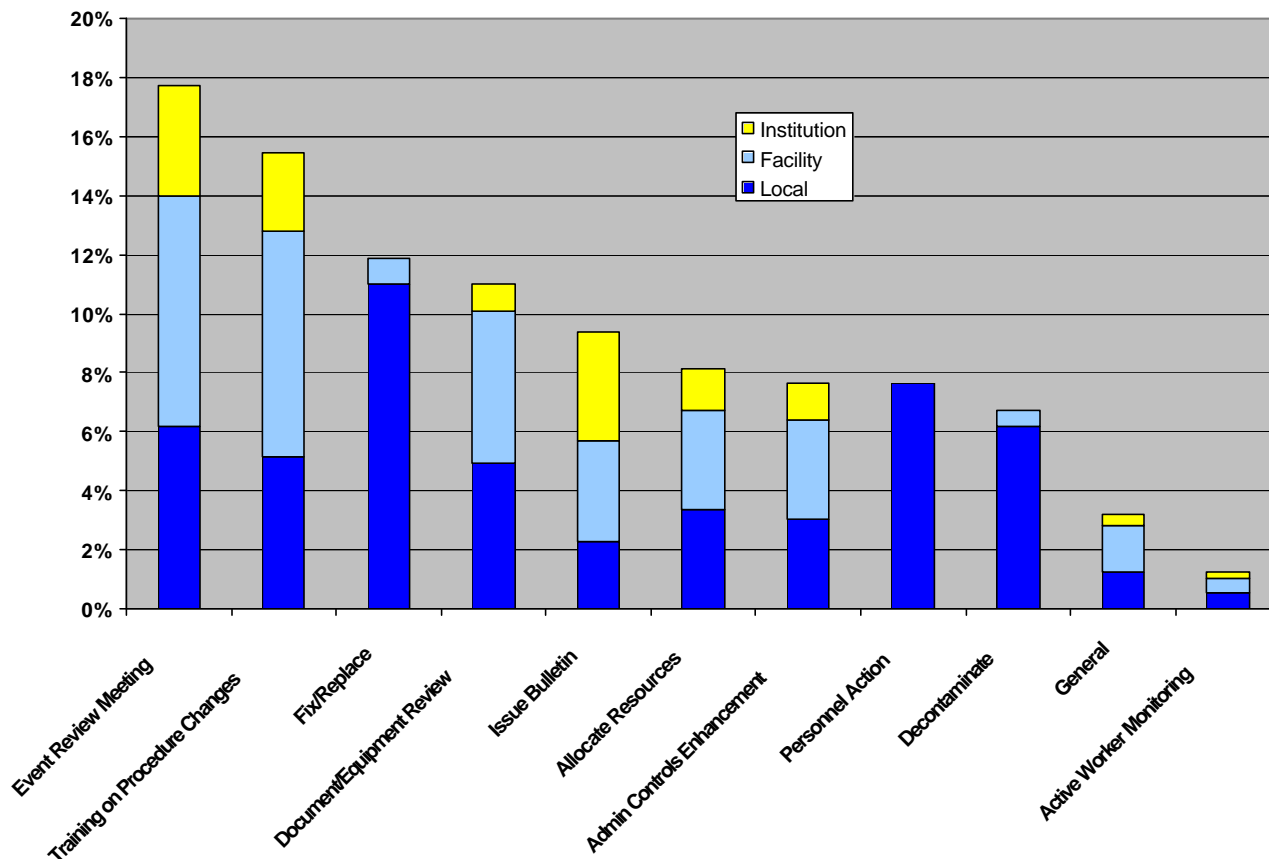
LANL Administrative Control Actions



Administrative Control Actions (10/01/99 to Present)

- More than 75% of administrative control actions involve modifying or writing new procedures at facility or local level
- Less than 20% involve procedural changes at institutional level
- About 5% of actions involve changes in postings, labels, etc.

LANL Performance Surety Actions



Performance Surety Actions (10/01/99 to Present)

- Nearly 80% of performance surety actions involve reactive, one-time responses—meetings, memos, decon, process reviews, etc.
- 8% involve enhancements to existing administrative controls (i.e., increasing frequency of surveys)
- Less than 2% involve active monitoring of worker performance/procedural compliance



LANL Organizational Review

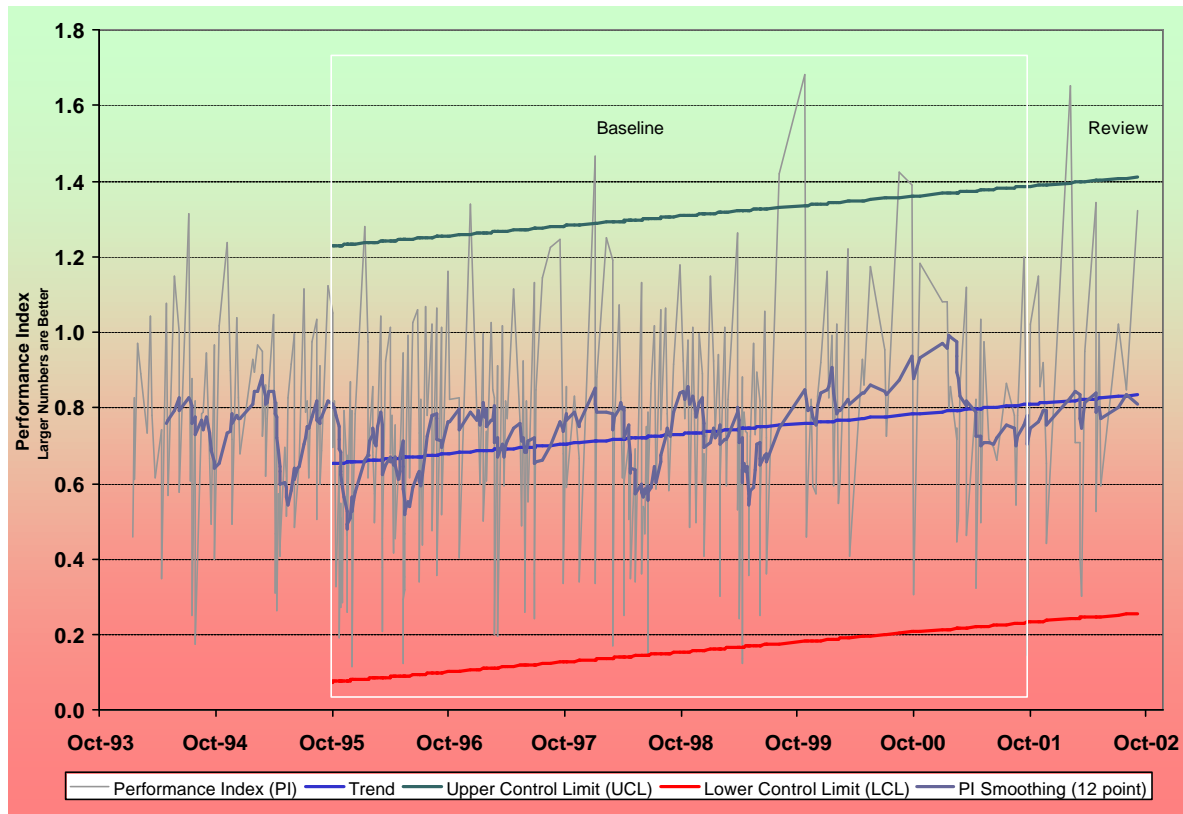
FY2002



NMT (TA-55) Division Occurrences

FY2002

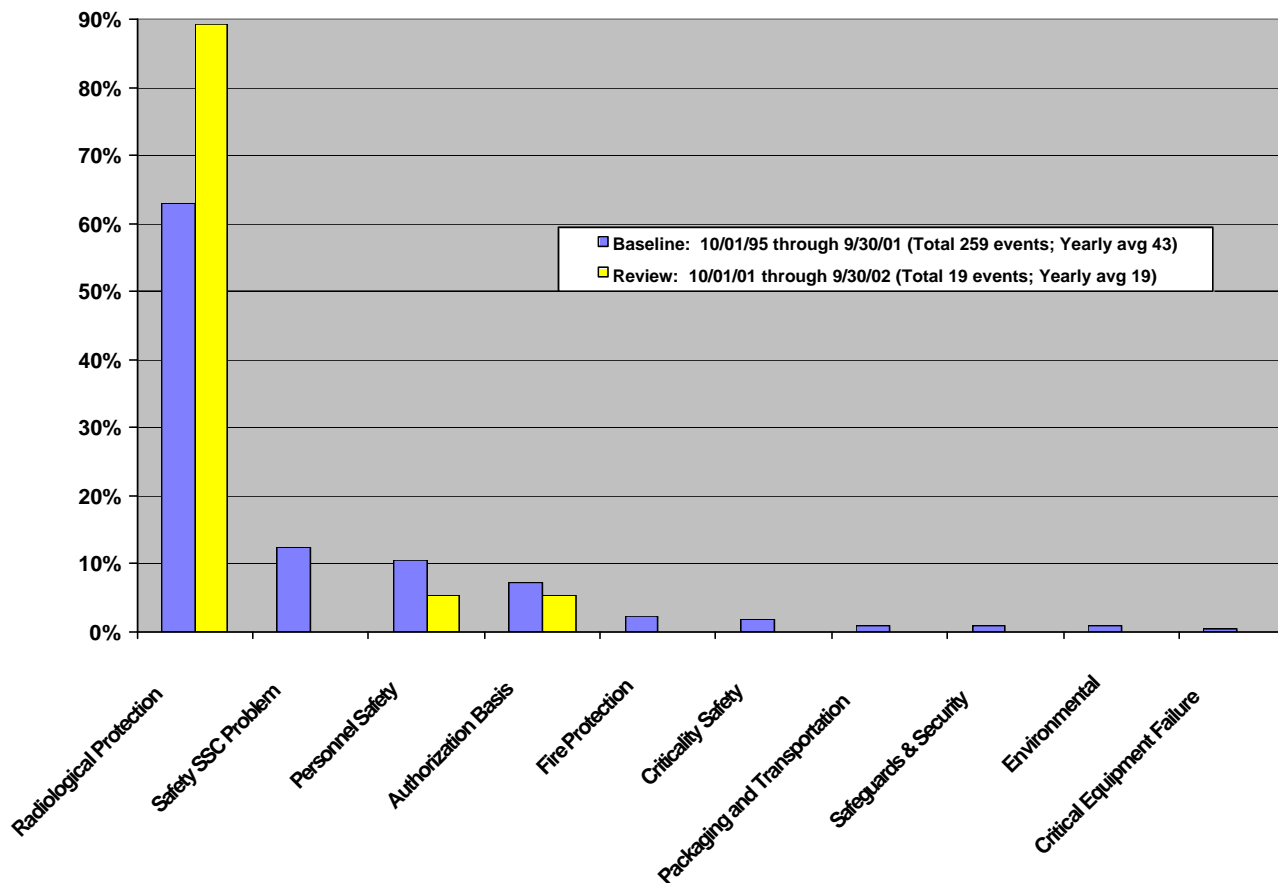
TA-55 Occurrence Performance



TA-55 PI Control Chart
(1/94 to 10/02)

- 356 events severity weighted 2, 3, or 4
 - Pre-Baseline: 78 events
 - Baseline: 259 events
 - Review: 19 events
- Overall PI improvement since 1995
- Improving performance during baseline
- Continuing improved performance for review period

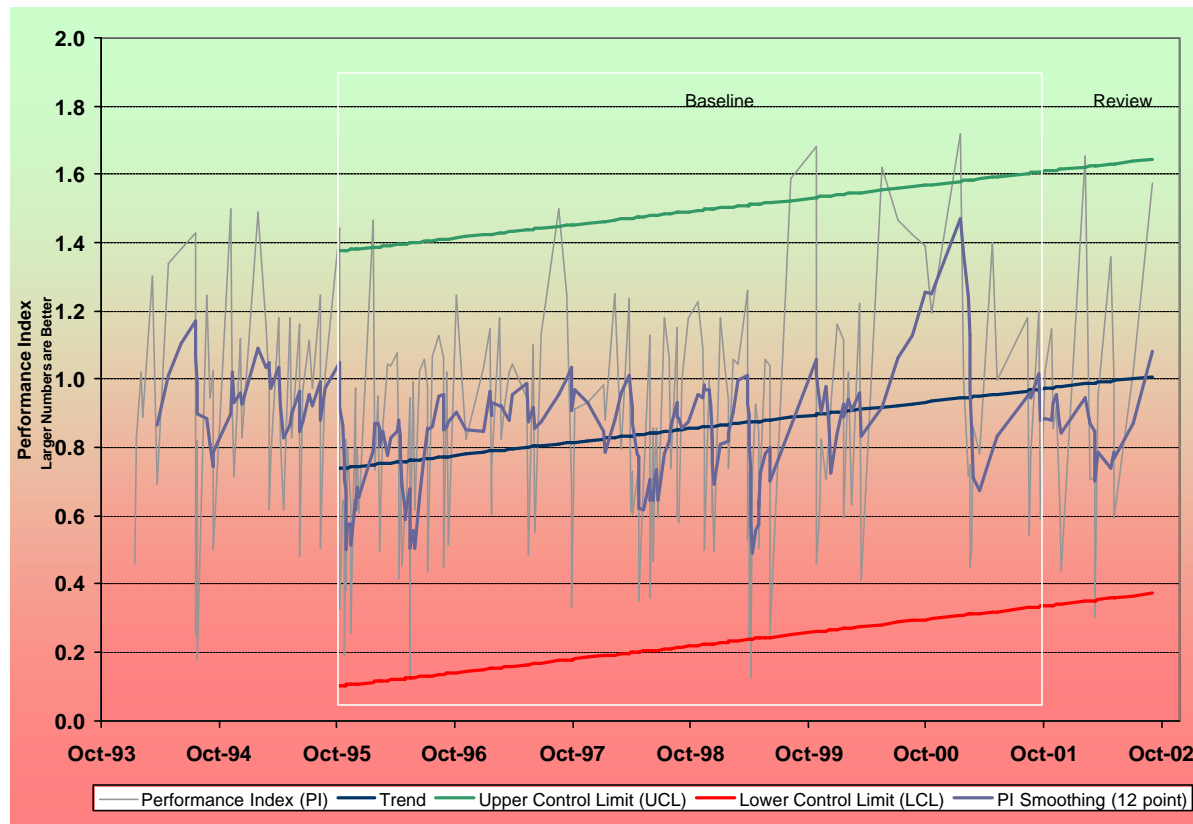
Type Distribution of TA-55 Occurrences



Occurrences by Type Baseline vs. Review

- Radiological Protection accounts for more than 60% in baseline—and 90% in review period
- Significant decrease in other types of occurrences at TA-55 for review period

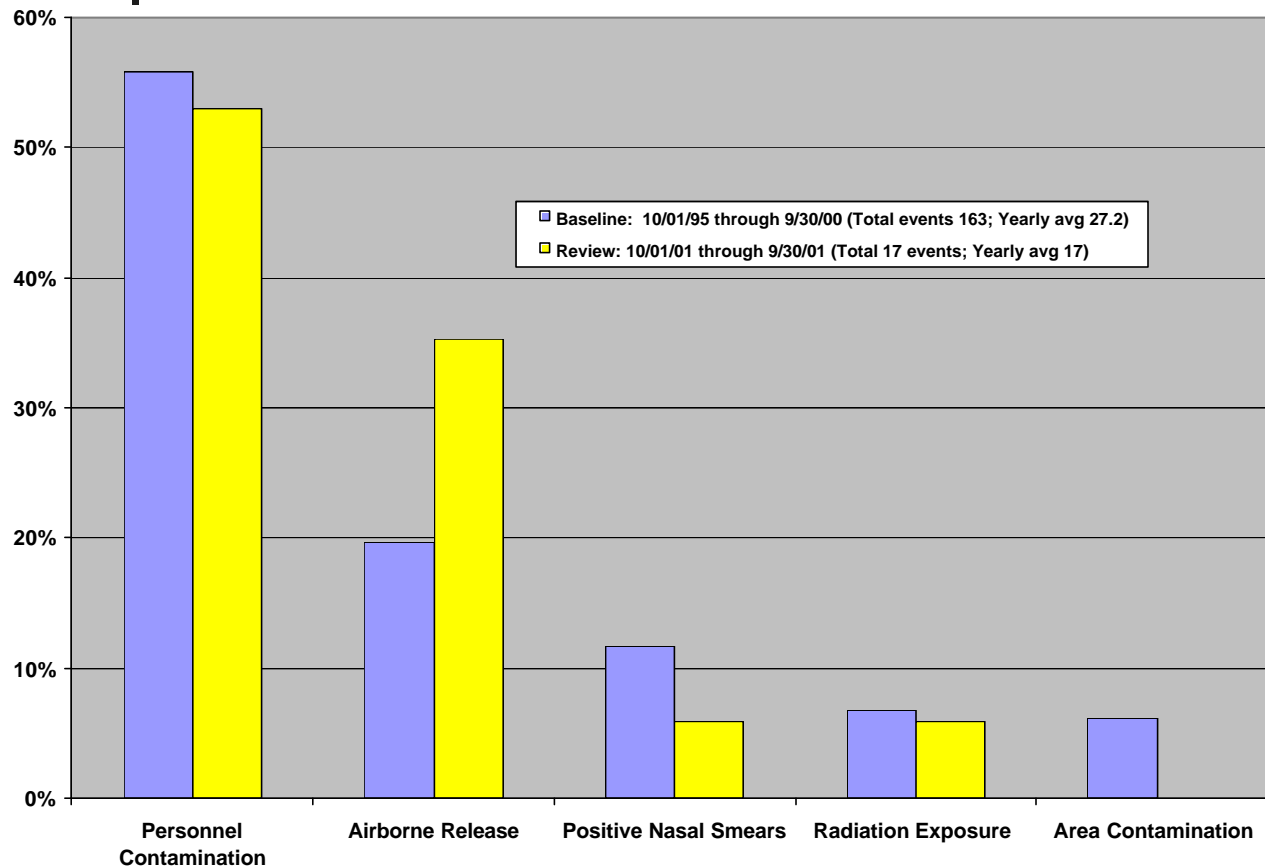
TA-55 Radiological Protection Occurrence Performance



Radiological Protection Control Chart (1/94 to 10/02)

- 220 events severity weighted 2 or 3
 - Pre-Baseline: 40 events
 - Baseline: 163 events
 - Review: 17 events
- Overall PI improvement since 1995
- Improving performance during baseline
- Static performance for review period

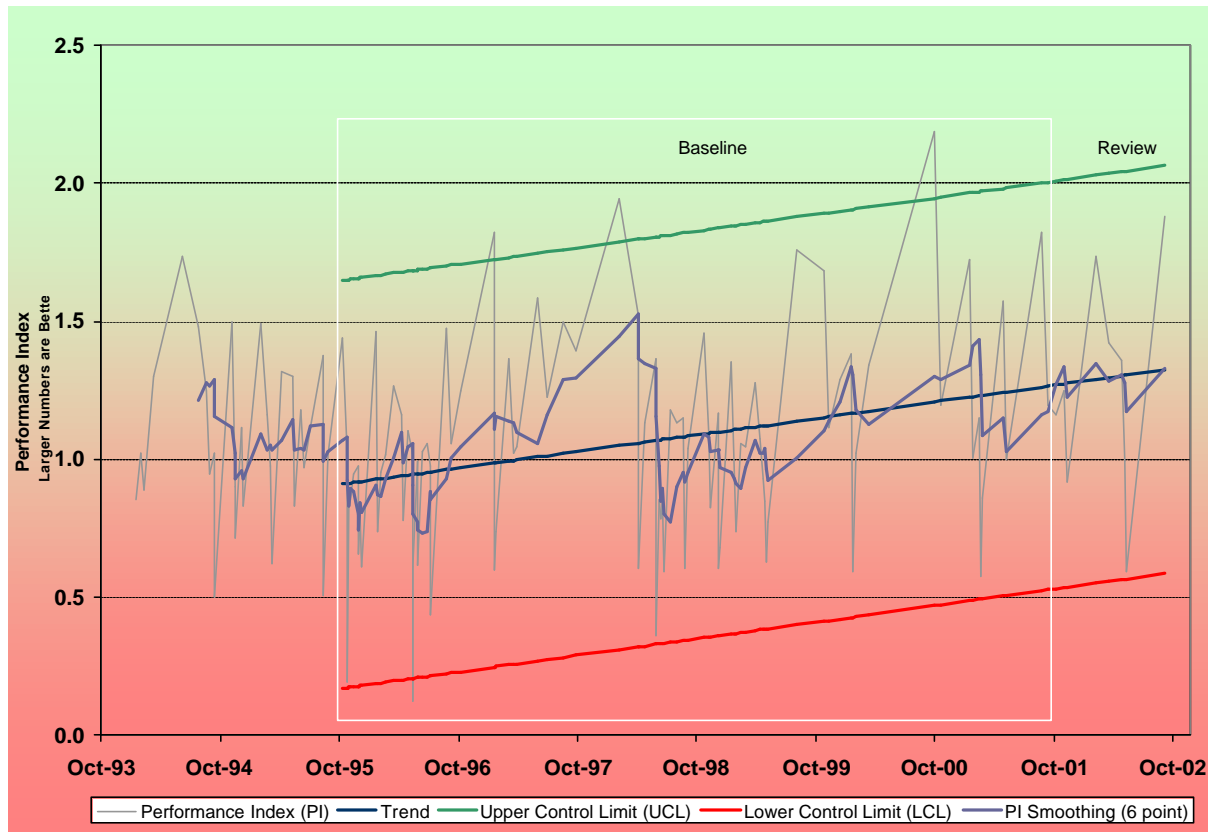
Types of TA-55 Radiological Protection Occurrences



TA-55 Radiological Occurrences by Type Baseline vs. Review

- Personnel contamination events account for more than 50% in baseline and review
- Airborne releases only type to show significant increase—from 20% in baseline to 35% in review

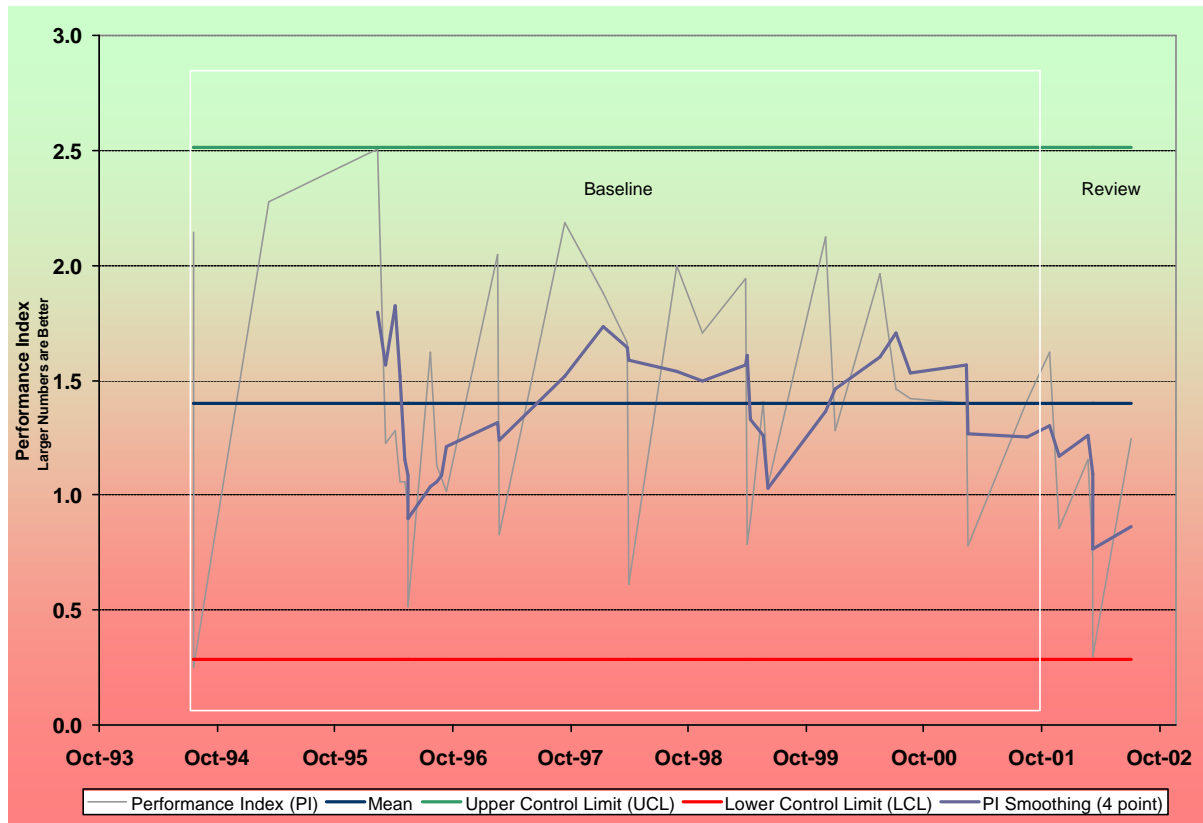
TA-55 Personnel Contamination Occurrence Performance



Personnel Contamination Control Chart (10/95 to 10/02)

- 100 events severity weighted 2, 3, or 4
- Overall PI improvement since 1995
- Improving performance during baseline
- Continuing improved performance for review period—no further evaluation

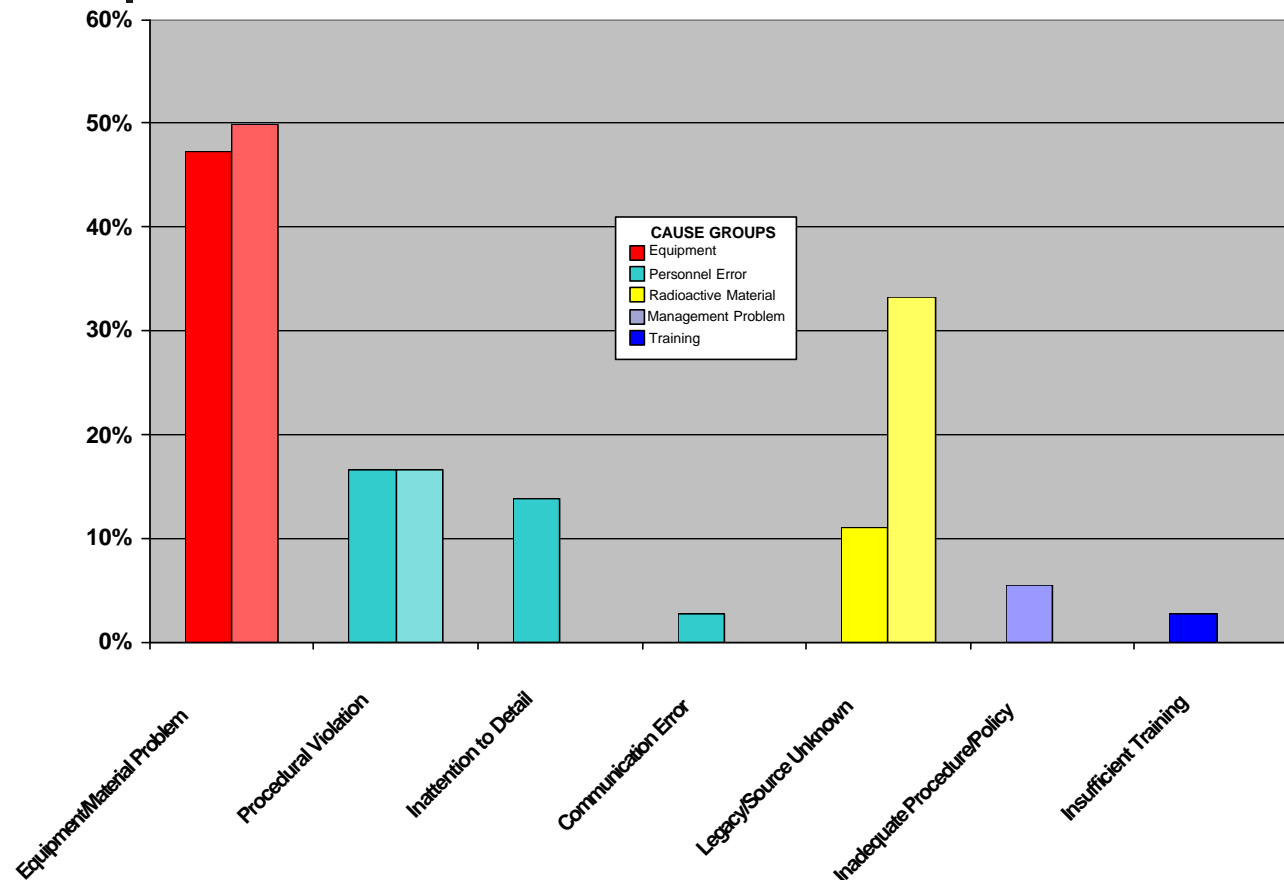
TA-55 Airborne Release Occurrence Performance



Airborne Release Control Chart
(1/94 to 10/02)

- 42 events severity weighted 2 or 3
 - Baseline: 36 events
 - Review: 6 events
- Static performance since 1994
- Declining performance during review period

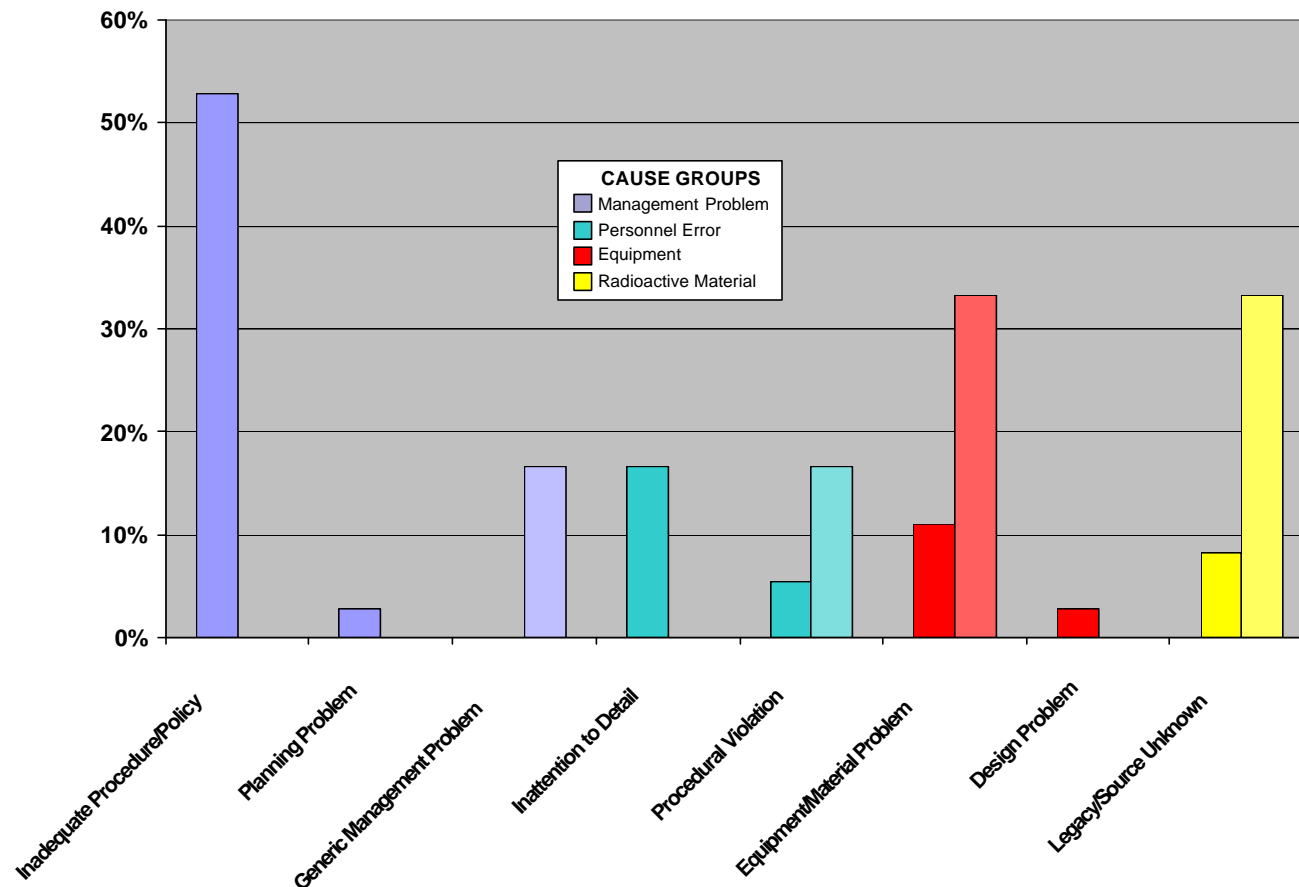
Direct Causes of TA-55 Airborne Releases



Direct Causes Baseline vs. Review

- Nearly 50% of events in baseline and review identify equipment problems as direct cause
- Personnel error direct causes dropped significantly for review period
- Legacy contamination or unknown source emerging as direct cause

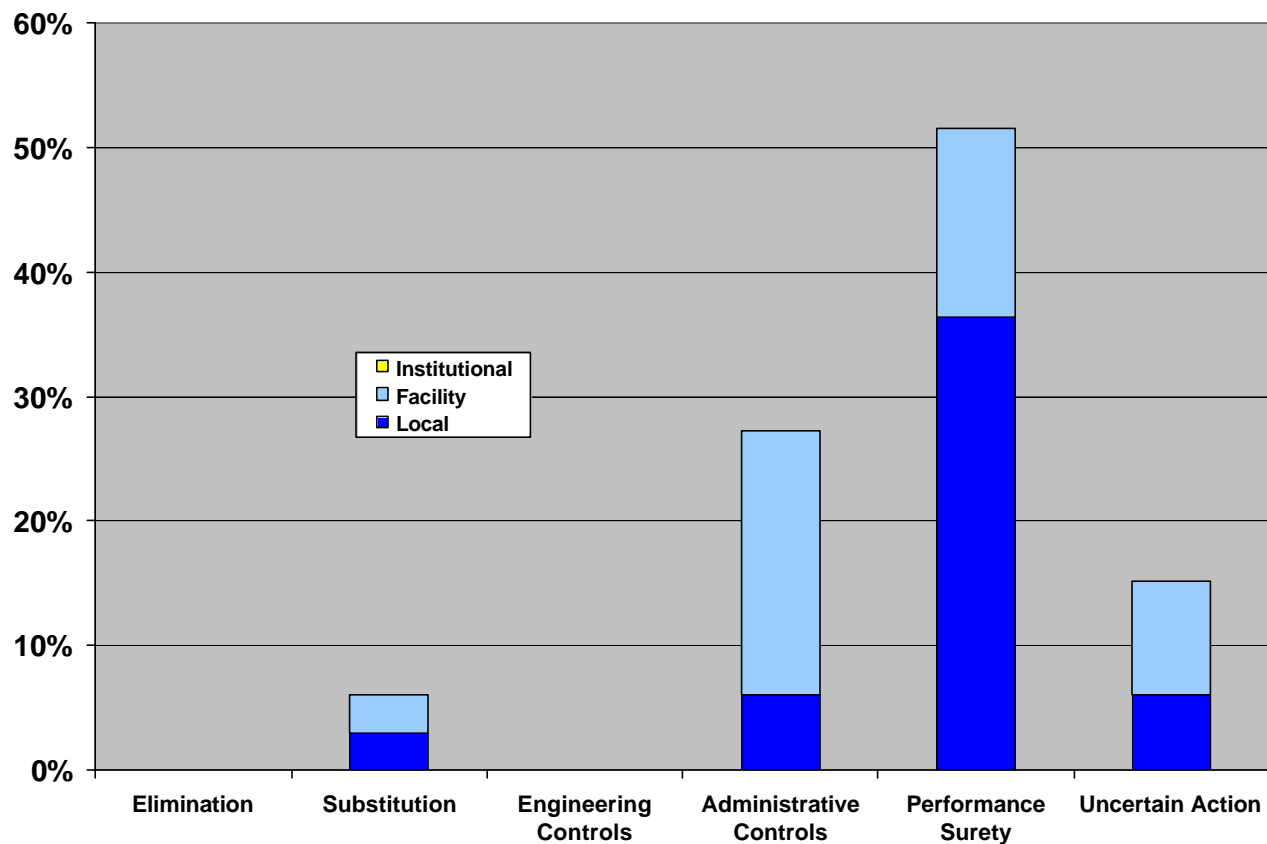
Root Causes of TA-55 Airborne Releases



Root Causes Baseline vs. Review

- Management-related causes decreased sharply—from 56% in baseline to 17% in review
- Emergence of Equipment Problem and Legacy Contamination root causes—matching direct causes

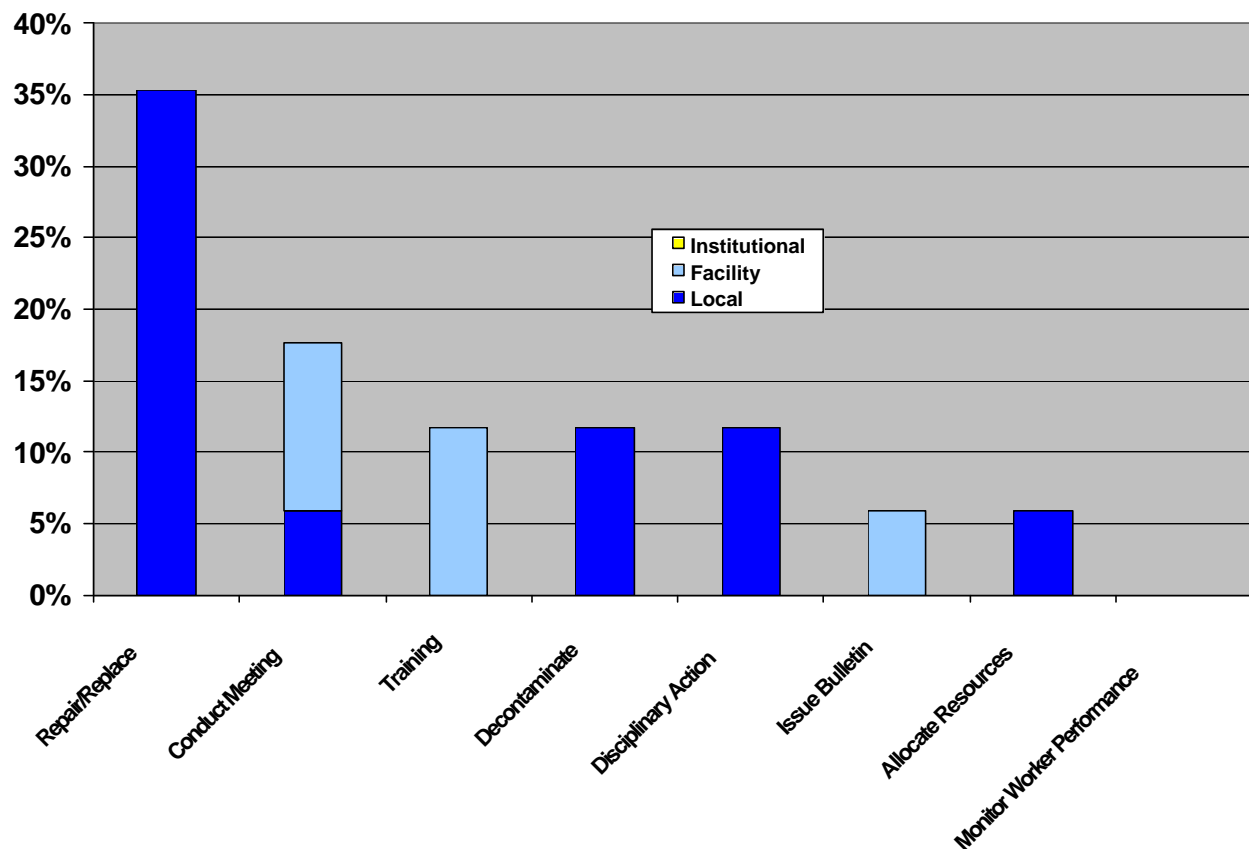
Profile of TA-55 Corrective Actions for Airborne Releases



Corrective Actions (10/01/99 to Present)

- Less than 7% of actions target eliminating or substituting for lesser hazard
- No actions specify new or modified engineering barriers
- Nearly 80% of all actions target procedural changes or "performance surety" actions
- 100% of actions at facility or local level

TA-55 Airborne Release Performance Surety Actions



Performance Surety Actions

(10/01/99 to Present)

- 35% of performance surety actions involve local one-time repairs of an equipment problem—no actions at facility level
- 60% involve reactive, one-time actions—meetings, memos, decon, etc.

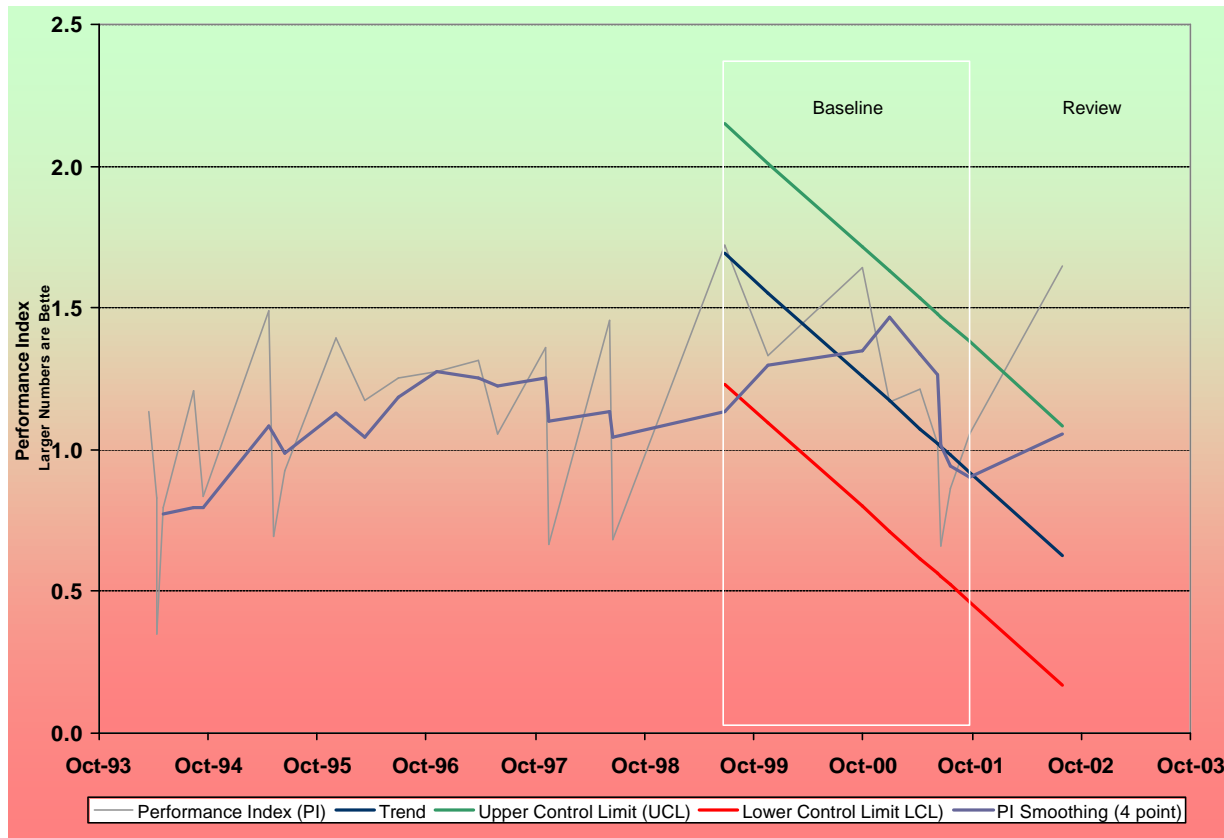
TA-55 Personnel Safety Occurrence Performance



Personnel Safety
Control Chart
(1/94 to 10/02)

- 38 events severity weighted 2 or 3
- Static performance during baseline
- Improved performance in review period—no further evaluation

TA-55 Authorization Basis Occurrence Performance



Authorization Basis
Control Chart
(6/99 to 10/02)

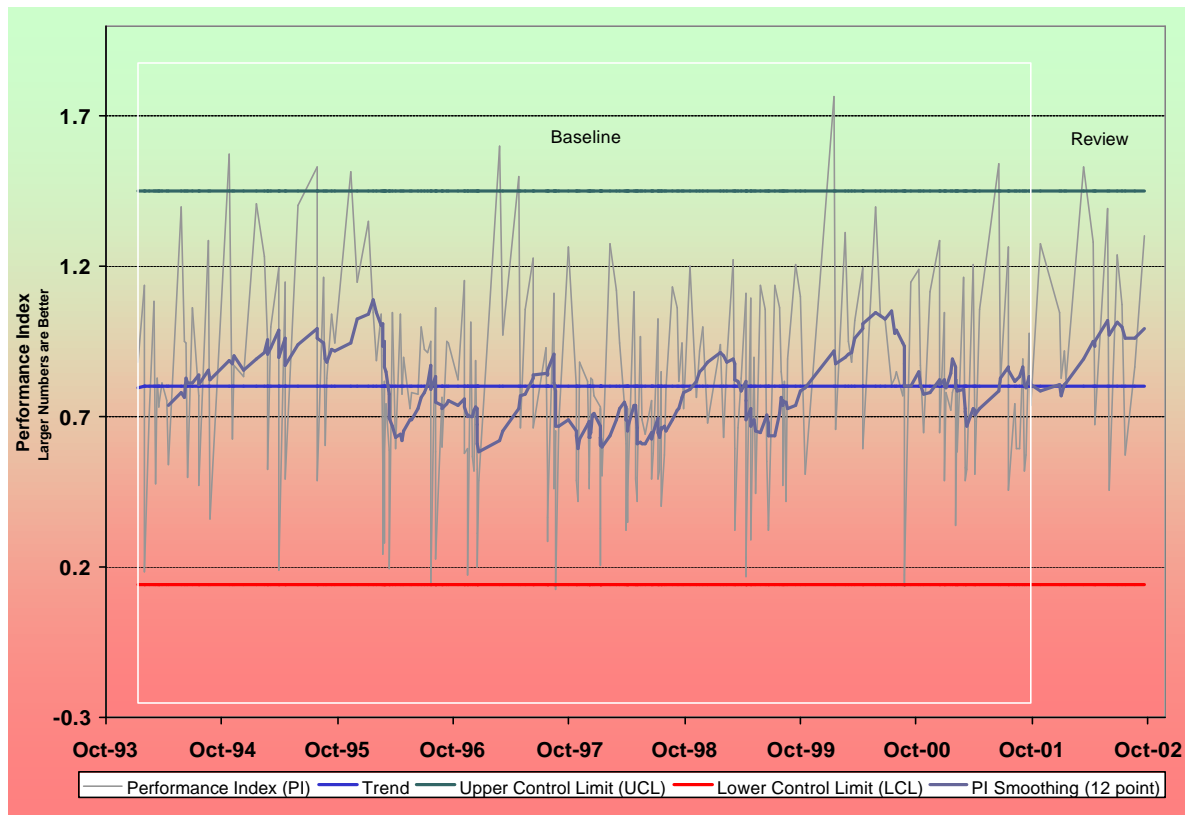
- 10 events severity weighted 3
- Decreasing performance during baseline
- Improved performance in review period—no further evaluation



NMT (CMR) Division Occurrences

FY2002

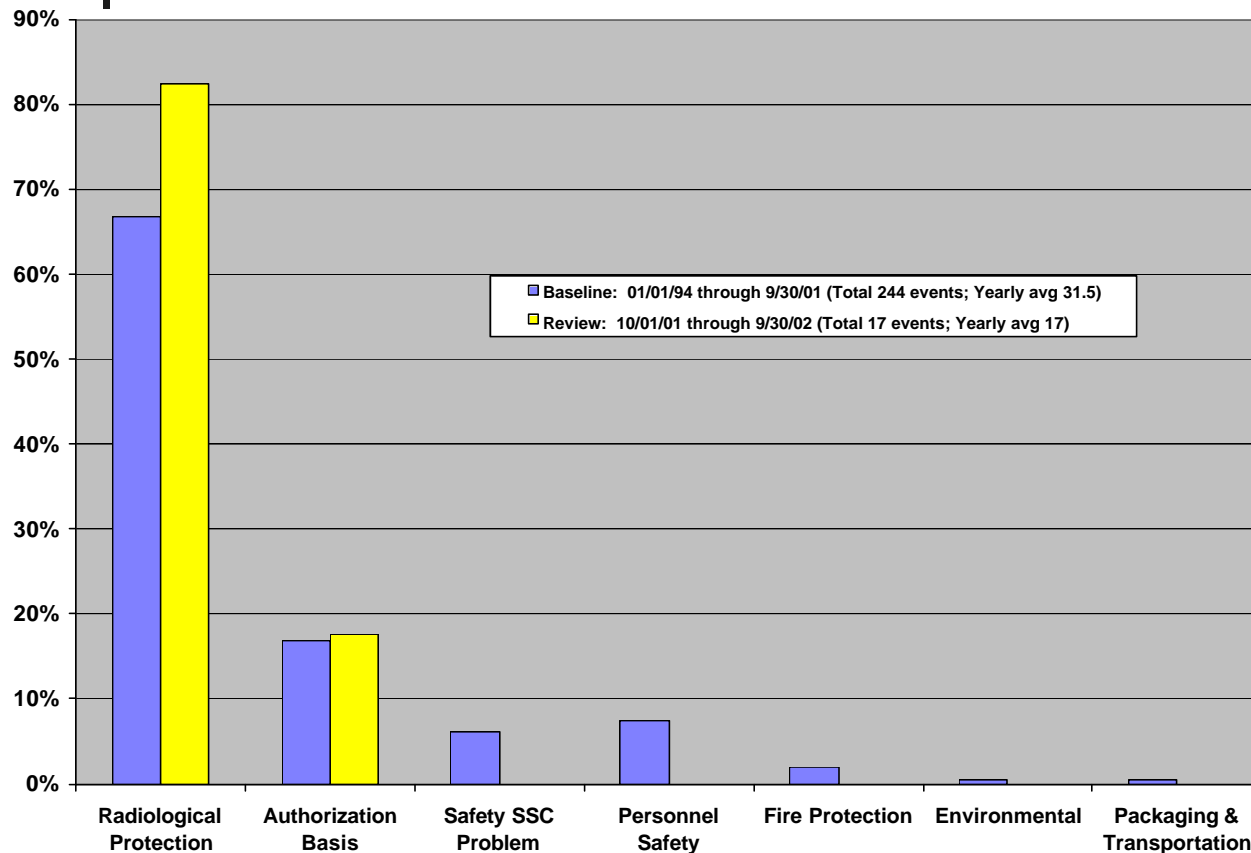
CMR Occurrence Performance



CMR PI Control Chart
(1/94 to 10/02)

- 261 events severity weighted 2, 3, or 4
 - Baseline: 244 events
 - Review: 17 events
- Static PI trend since 1994
- Improving performance during review period

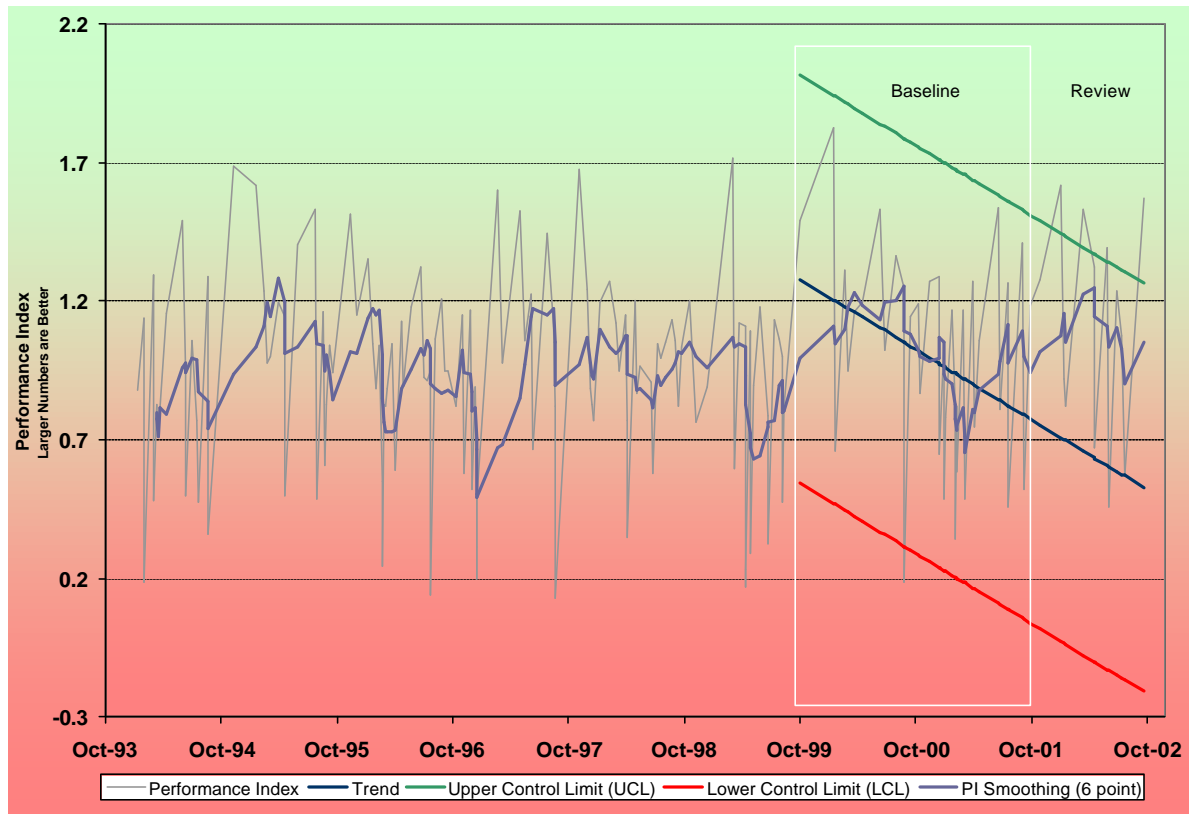
Type Distribution of CMR Occurrences



Occurrences by Type Baseline vs. Review

- Radiological Protection accounts for 67% in baseline and 82% in review period
- Static percentage of authorization basis occurrences
- Decrease in other types of occurrences for review period

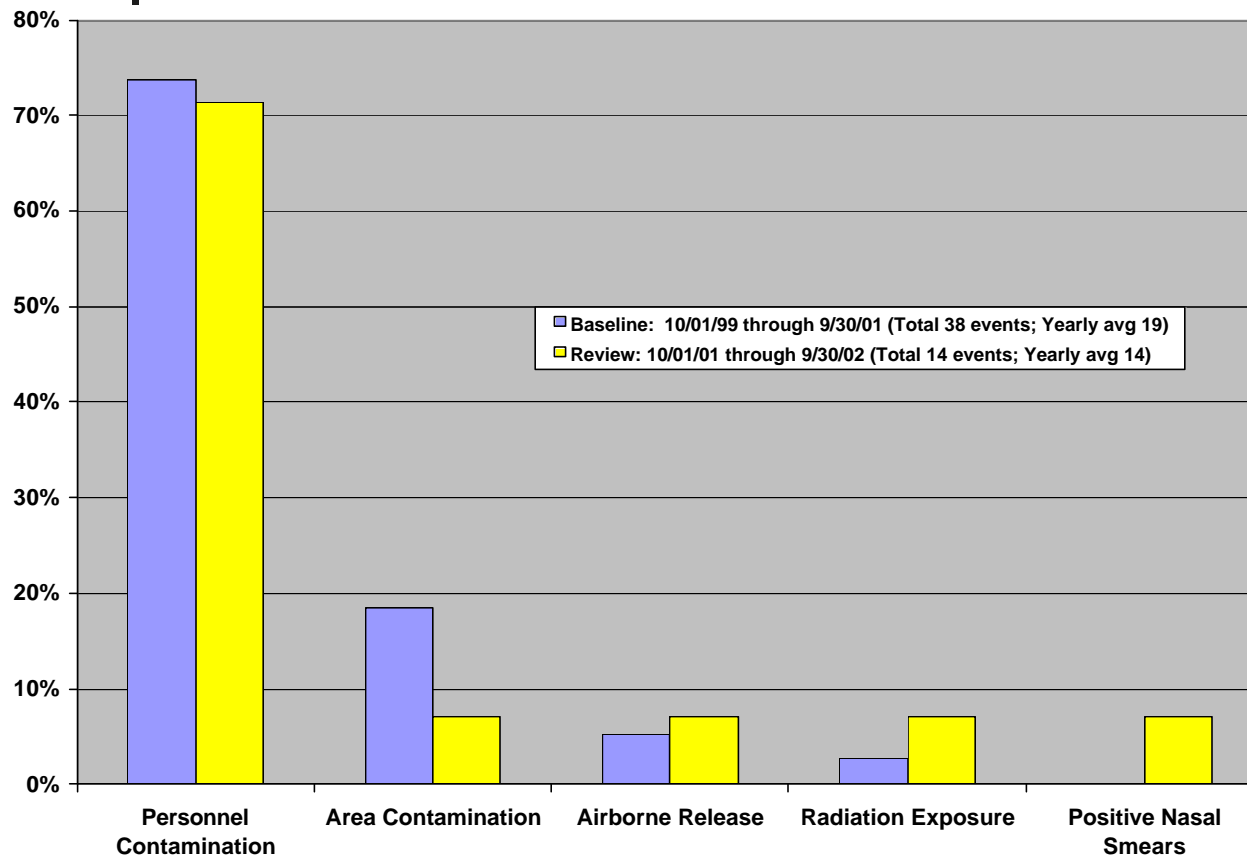
CMR Radiological Protection Occurrence Performance



Radiological Protection
Control Chart
(1/94 to 10/02)

- 177 events severity weighted 2, 3, or 4
 - Pre-Baseline: 125 events
 - Baseline: 38 events
 - Review: 14 events
- Declining PI performance during baseline
- Improving performance during review period

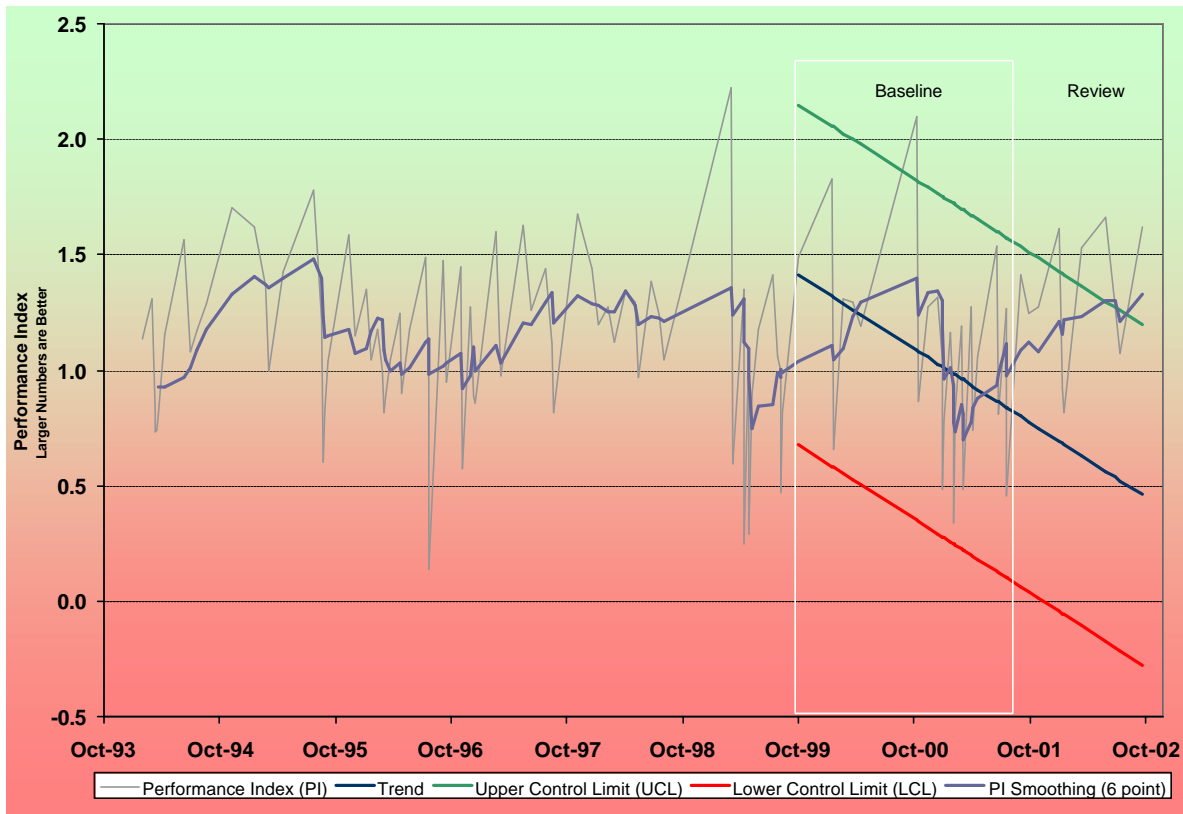
Types of CMR Radiological Protection Occurrences



CMR Radiological Occurrences by Type Baseline vs. Review

- Personnel contamination events account for more than 70% in baseline and review
- Area contamination shows marked improvement
- All other areas are less than 10% of total

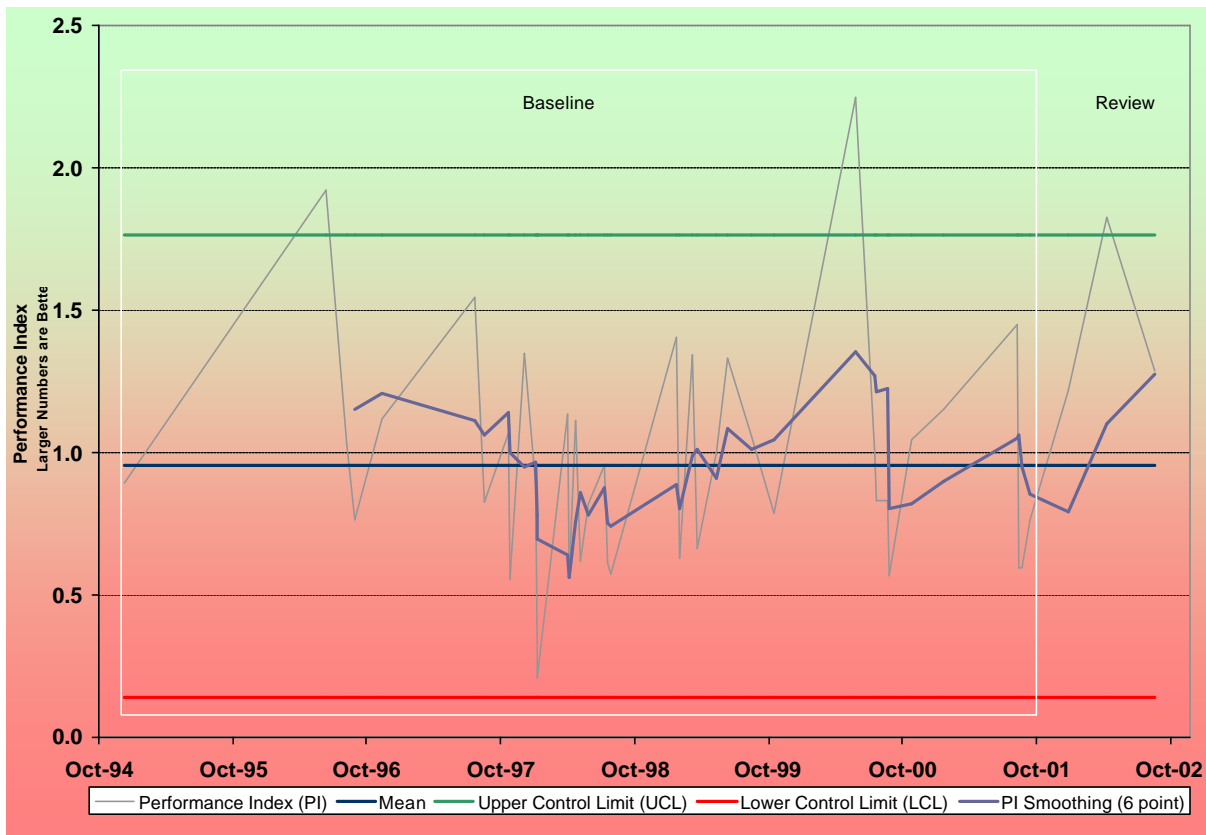
CMR Personnel Contamination Occurrence Performance



Personnel Contamination Control Chart
(10/95 to 10/02)

- 113 events severity weighted 2, 3, or 4
- Declining performance during baseline
- Marked improvement for review period—no further evaluation

CMR Authorization Basis Occurrence Performance



Authorization Basis Control Chart (1/94 to 10/02)

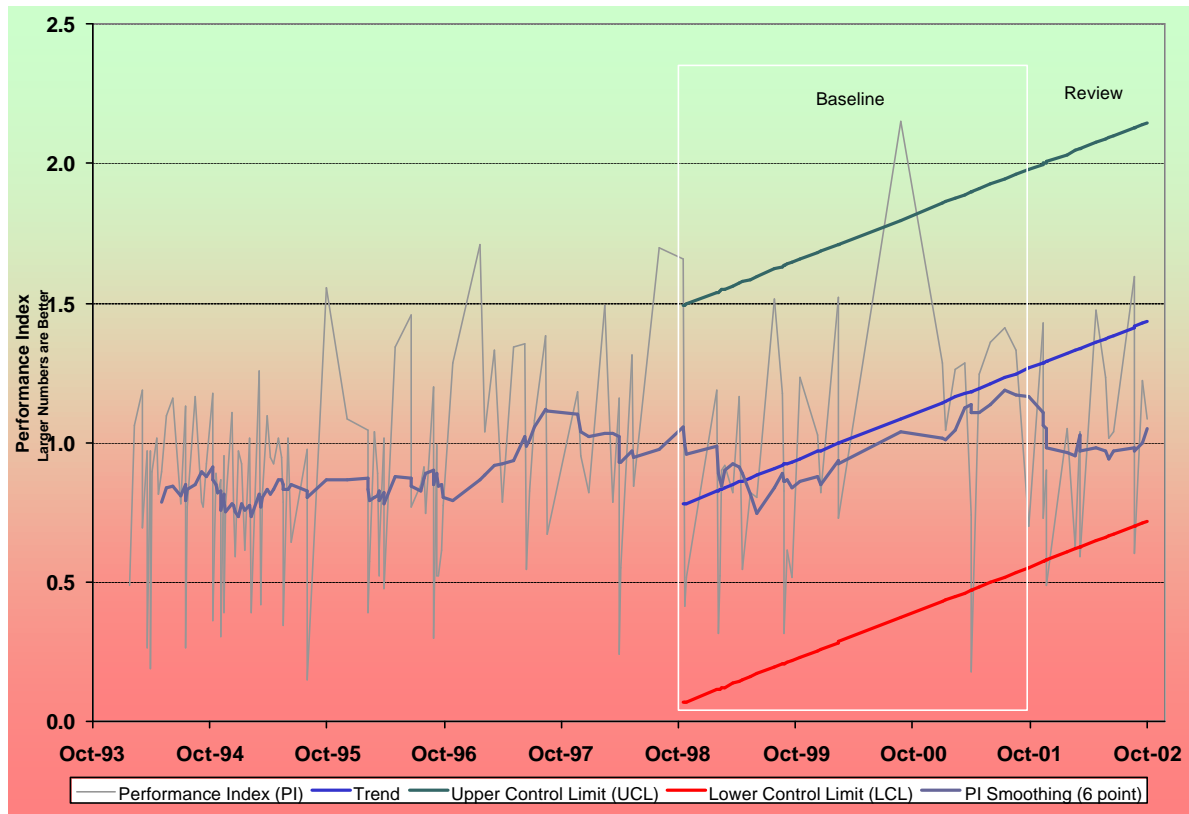
- 44 events severity weighted 2, 3, or 4
- Static performance during baseline
- Improving performance during review period—no further evaluation



FWO Division Occurrences

FY2002

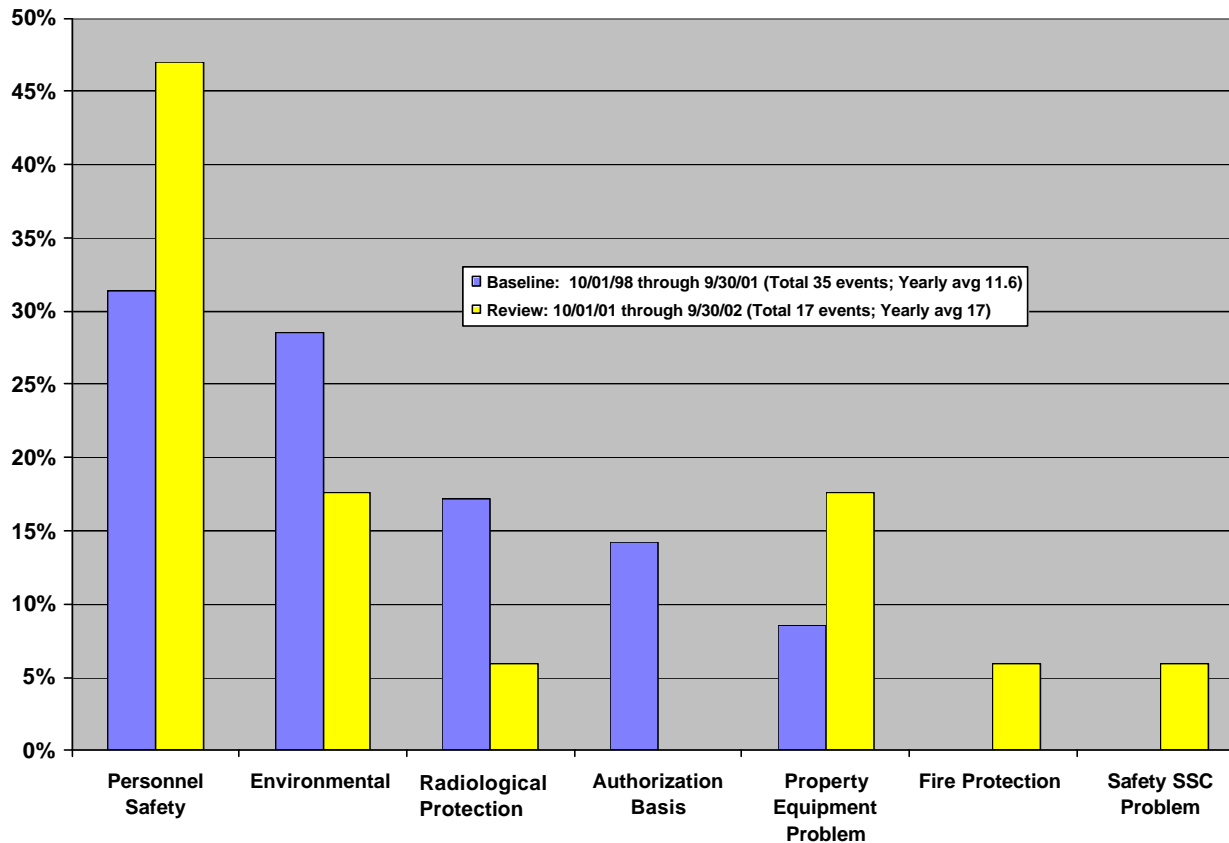
FWO Occurrence Performance



FWO PI Control Chart
(1/94 to 10/02)

- 153 total events severity weighted 2, 3, or 4
 - Pre-Baseline: 101 events
 - Baseline: 35 events
 - Review: 17 events
- Improving performance during baseline period
- Static performance during review period

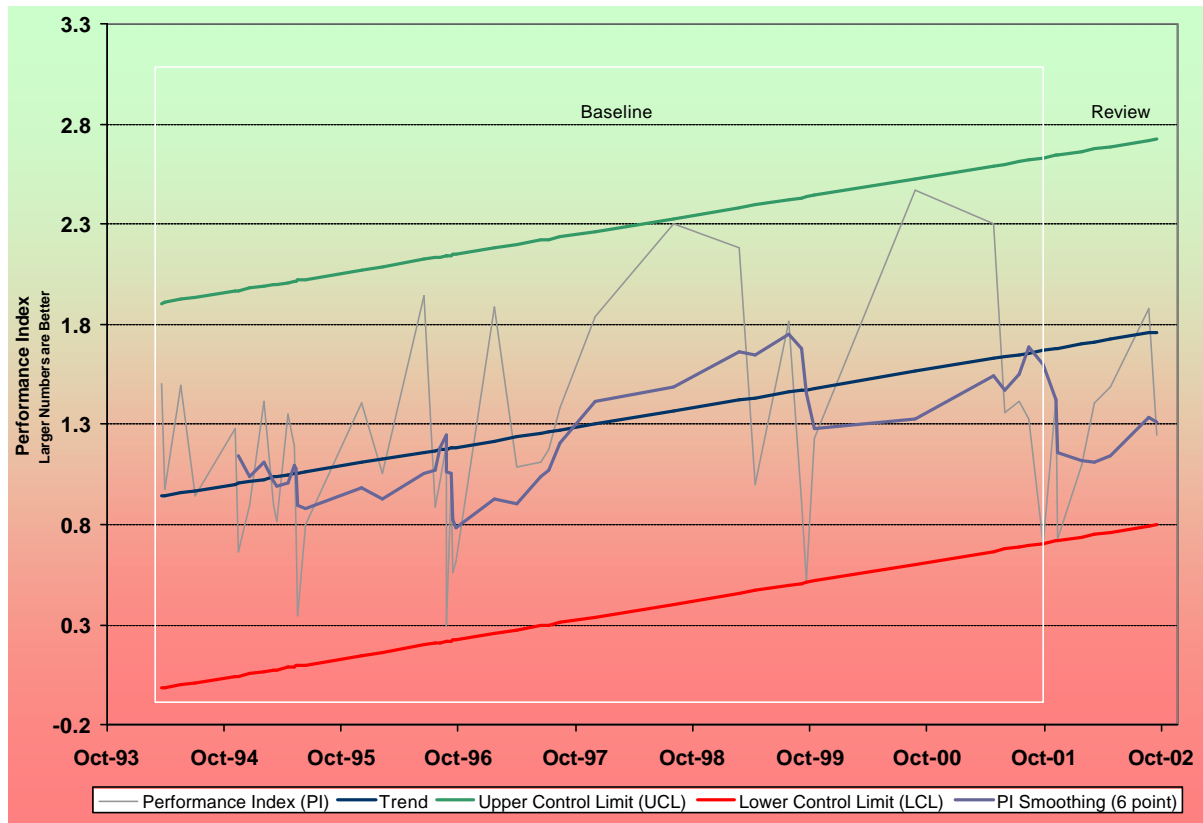
Type Distribution of FWO Occurrences



Occurrences by Type Baseline vs. Review

- Personnel Safety is predominant type in both baseline and review—31% and 47% respectively
- Other historical main types show declines in review period
- Emergence of property/equipment problems as a principal type

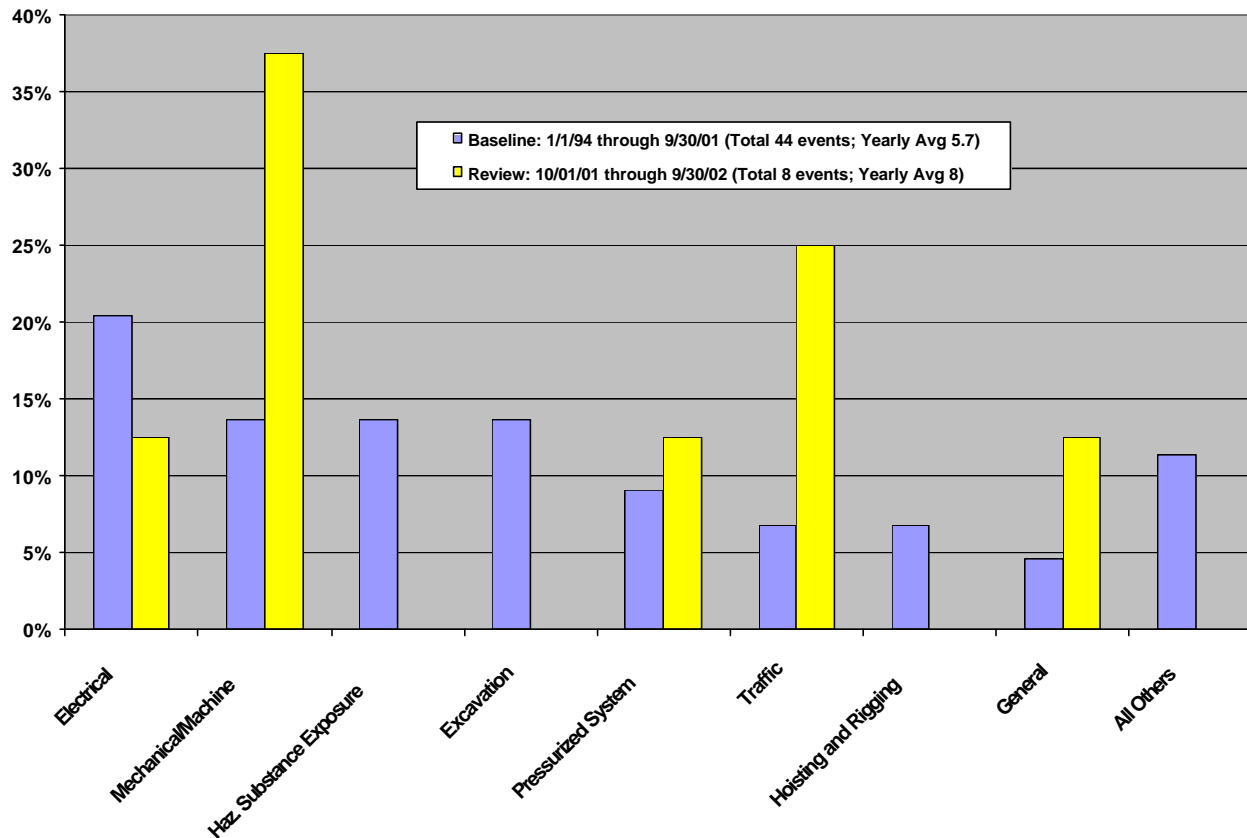
FWO Personnel Safety Occurrence Performance



Personnel Safety Control Chart
(1/94 to 10/02)

- 52 total events severity weighted 2, 3, or 4
 - Baseline: 44 events
 - Review: 8 events
- Improving performance during baseline period
- Static performance during review period

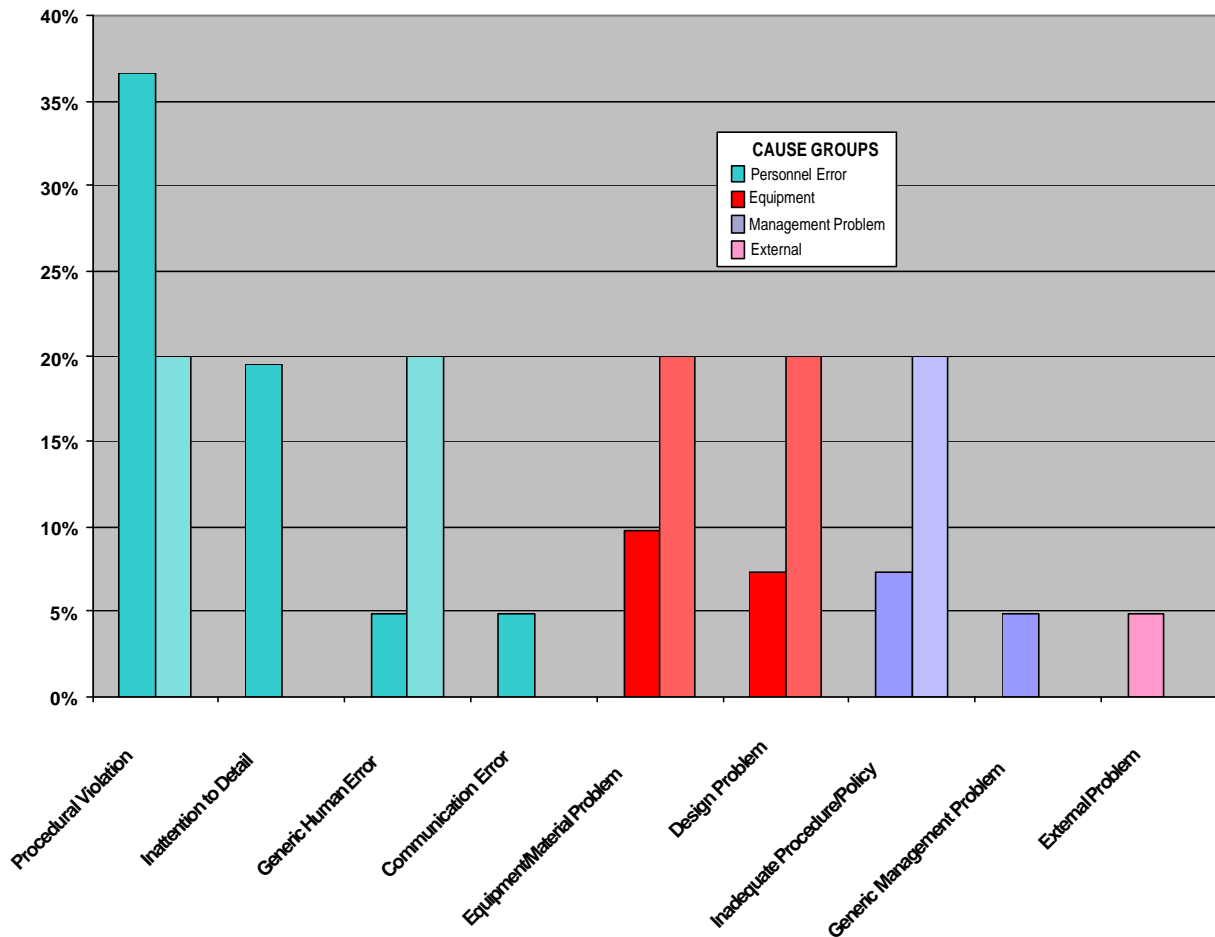
Types of FWO Personnel Safety Occurrences



FWO Personnel Safety Occurrences by Type Baseline vs. Review

- Relatively uniform distribution of types for baseline period
- 8 events distributed among 5 categories for review period
- Distribution pattern leads to analysis of causes and actions common to all personnel safety types

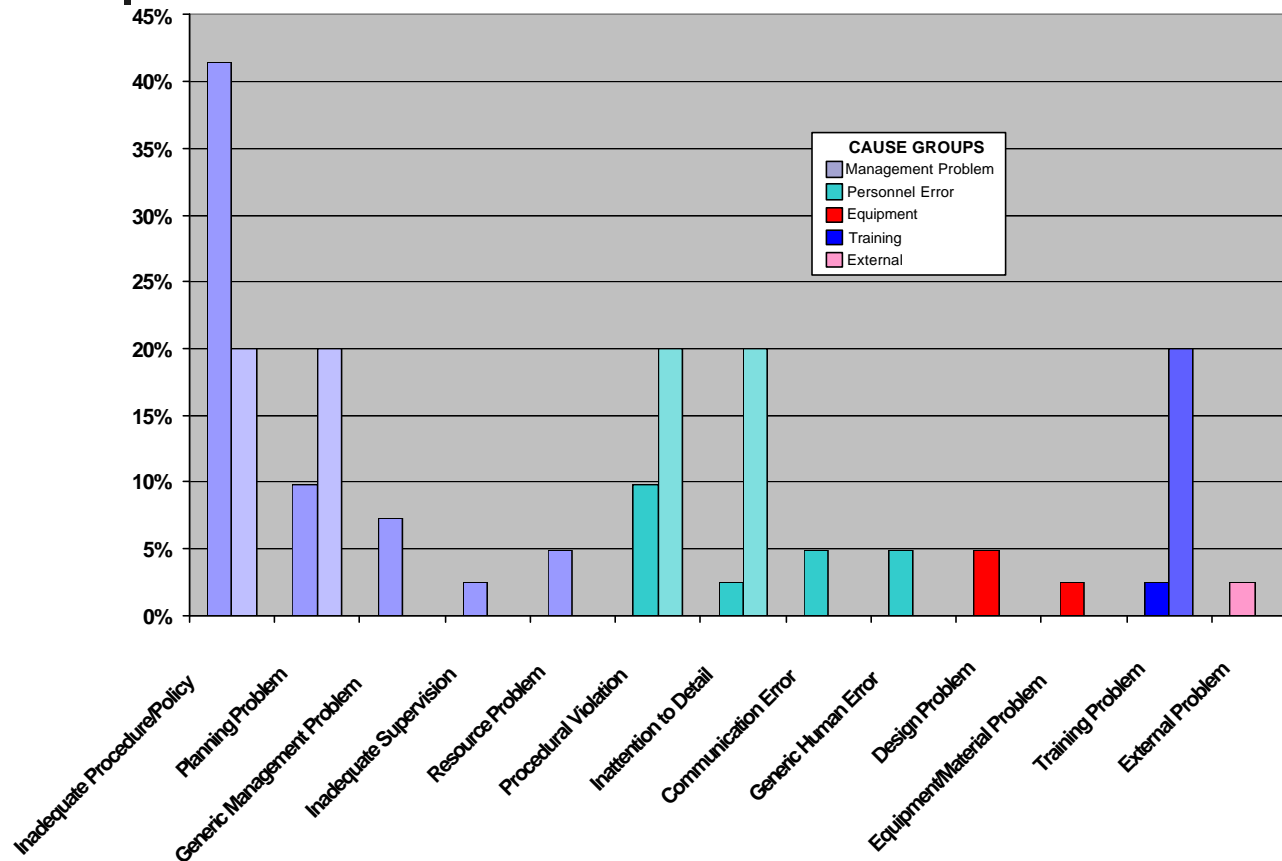
Direct Causes of FWO Personnel Safety Occurrences



Direct Causes Baseline vs. Review

- Direct cause pattern for review period relatively consistent with baseline period
- Personnel Error and Equipment Problem remain principal direct causes for personnel safety events

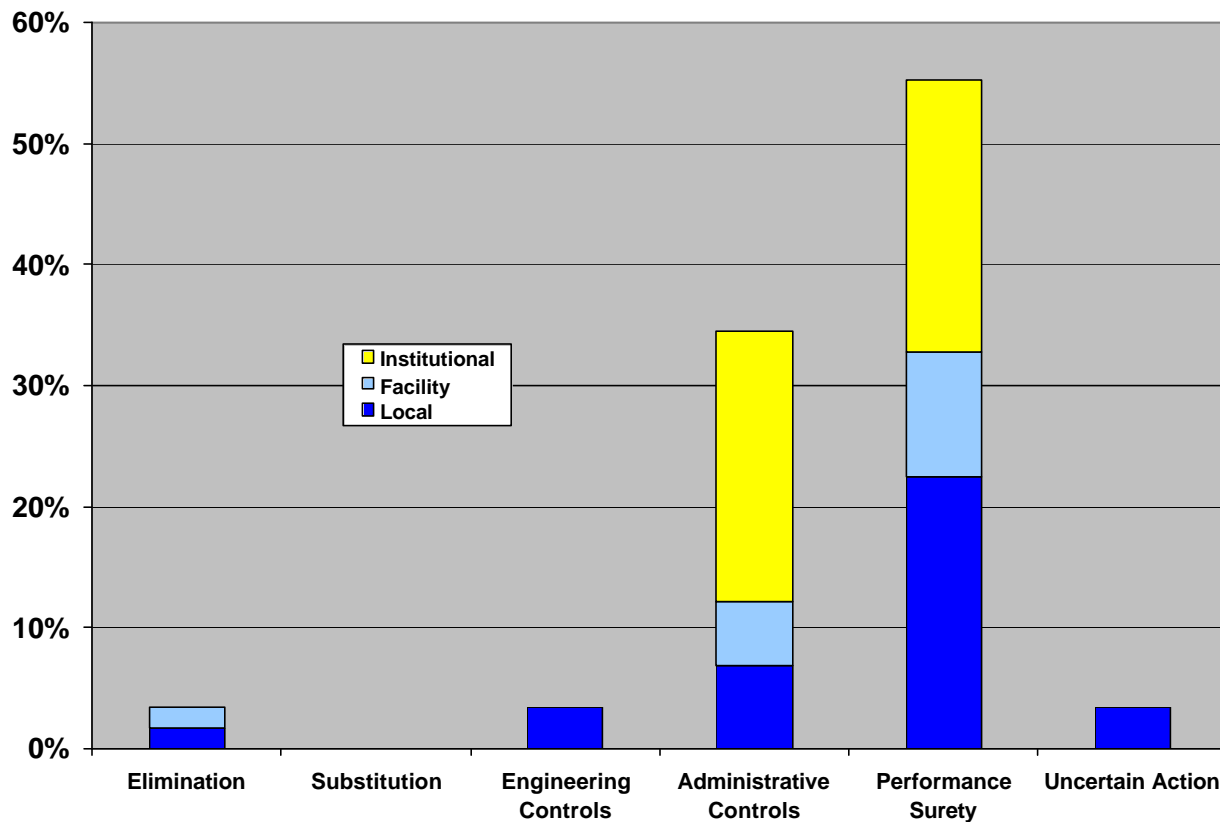
Root Causes of FWO Personnel Safety Occurrences



Root Causes Baseline vs. Review

- As with direct cause, root cause characterization for review period consistent with baseline period
- Inadequate Procedures and Personnel Error remain principal root causes

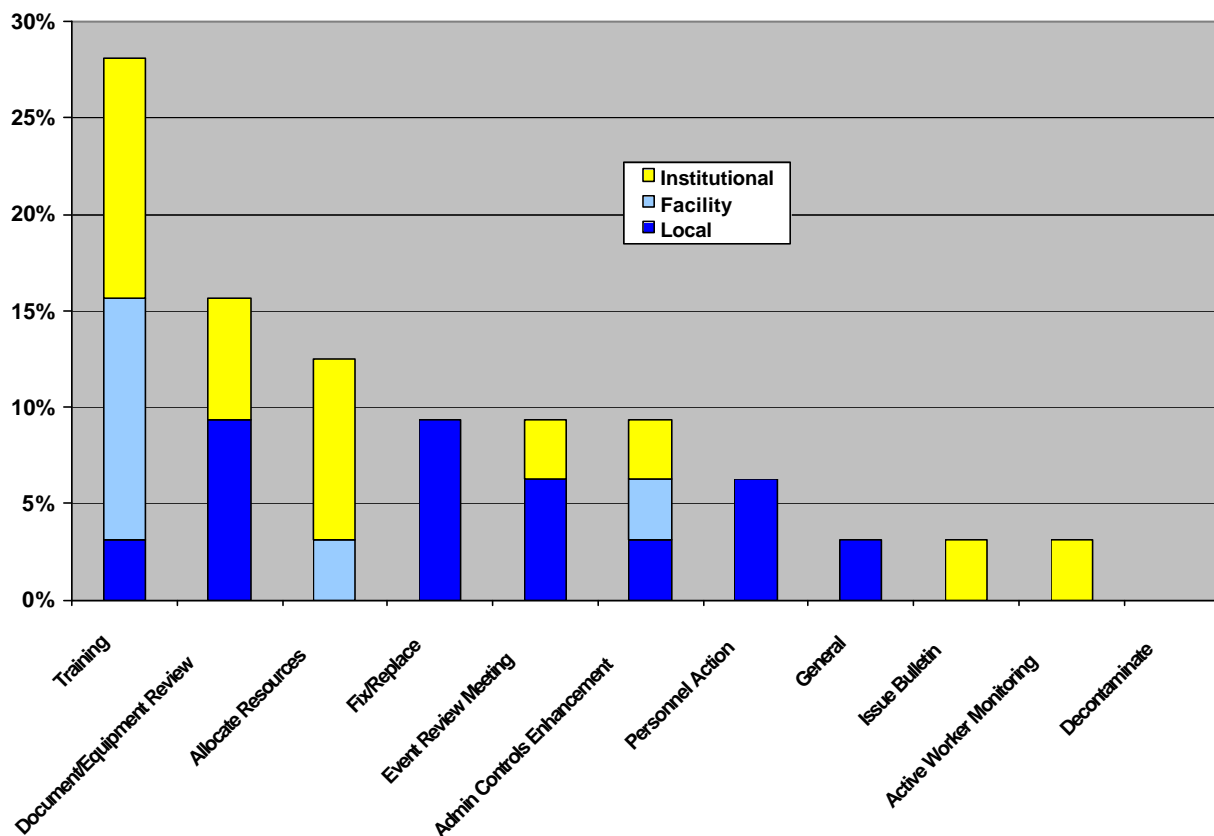
Profile of FWO Corrective Actions for Personnel Safety



Corrective Actions (10/01/99 to 10/02)

- Less than 4% of actions target eliminating or substituting for lesser hazard
- Less than 4% specify new or modified engineering barriers
- 44% of all actions targeted at institutional level
- Nearly 90% of all actions target procedural changes or “performance surety”—driven by causal patterns of personnel errors and inadequate procedures

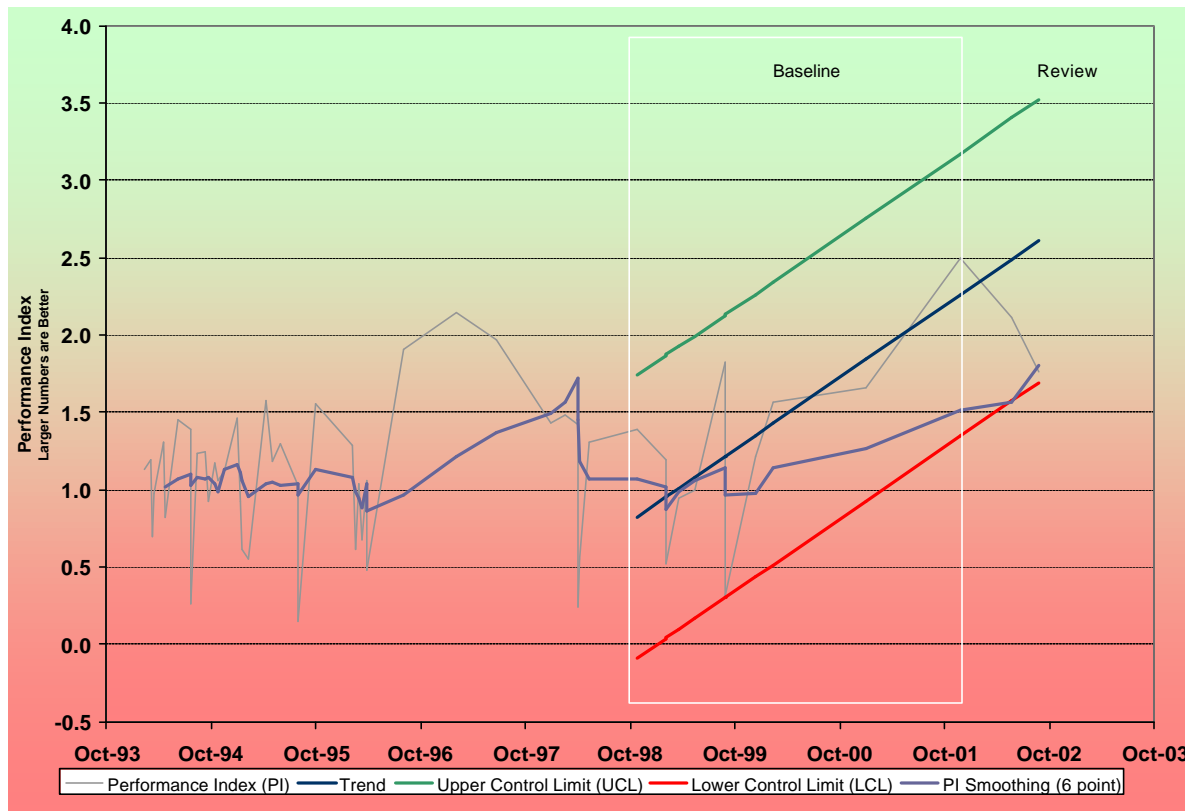
FWO Performance Surety Actions for Personnel Safety



Performance Surety Actions (10/01/99 to Present)

- Nearly 80% of performance surety actions involve reactive, one-time responses—meetings, memos, decon, process reviews, etc.
- 8% involve enhancements to existing administrative controls (i.e., increasing frequency of surveys)
- Less than 2% involve active monitoring of worker performance/procedural compliance

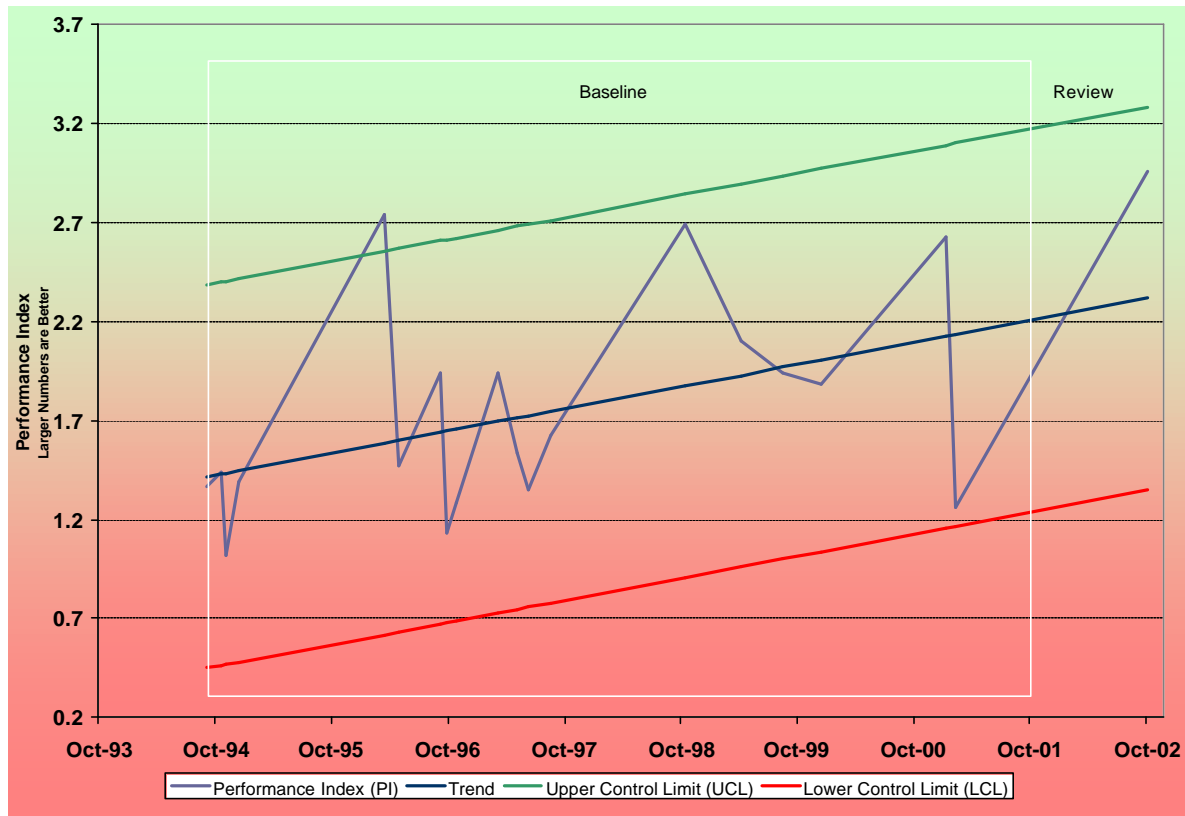
FWO Environmental Occurrence Performance



Environmental
Control Chart
(1/94 to 10/02)

- 54 events severity weighted 2, 3, or 4
 - Pre-Baseline: 41 events
 - Baseline: 11 events
 - Review: 2 events
- Significant improving performance during baseline period
- Continuing improved performance for review period—no further evaluation

FWO Radiological Protection Occurrence Performance



Radiological Protection Control Chart (1/94 to 10/02)

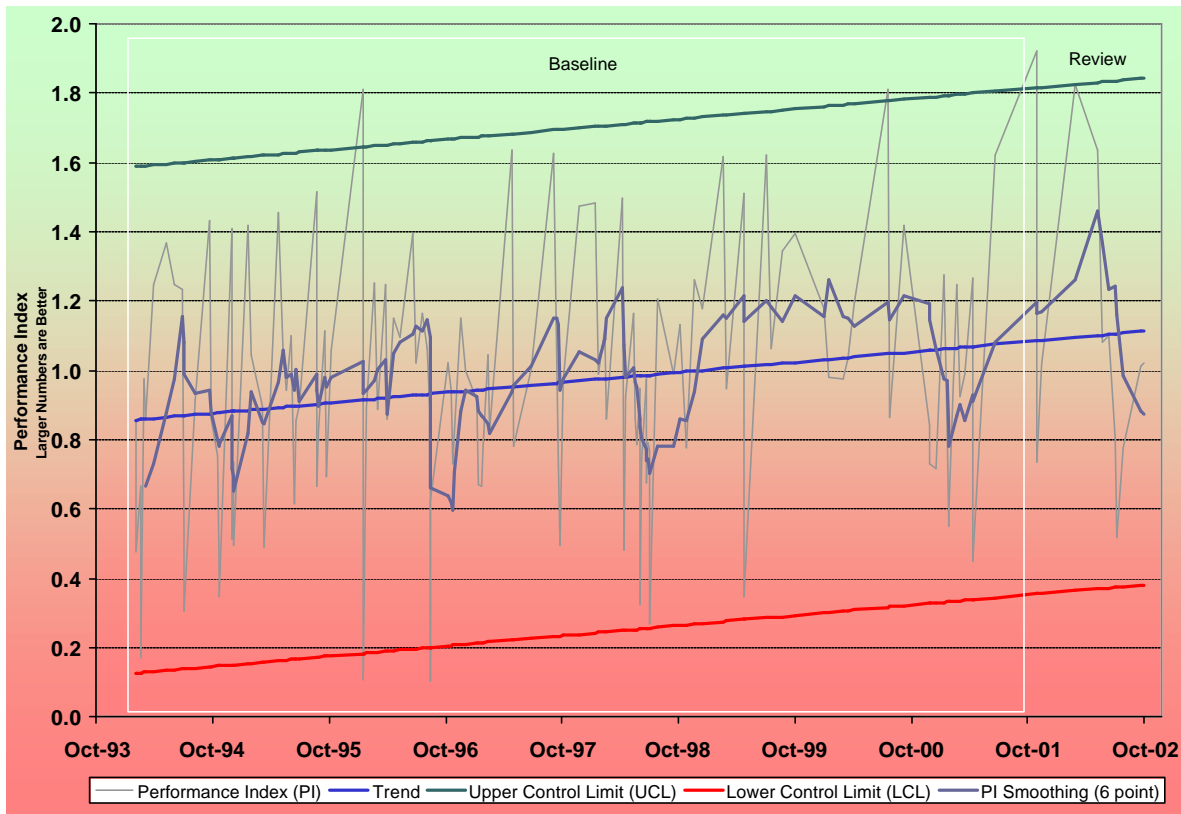
- 21 events severity weighted 2 or 3
 - Baseline: 20 events
 - Review: 1 event
- Improving performance during baseline period
- Continuing improved performance for review period—no further evaluation



ESA Division Occurrences

FY2002

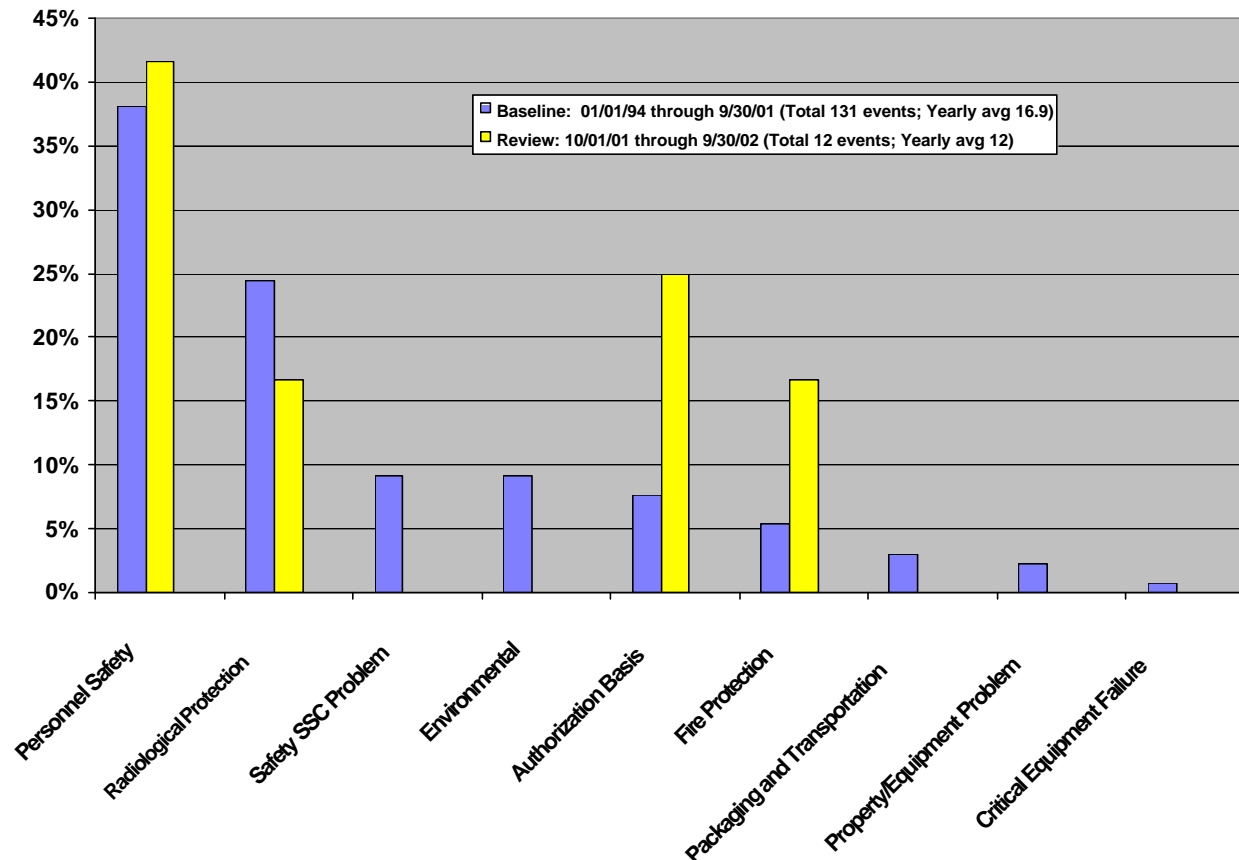
ESA Occurrence Performance



ESA PI Control Chart
(1/94 to 10/02)

- 143 total events severity weighted 2,3, or 4
 - Baseline: 131 events
 - Review: 12 events
- Improving performance during baseline period
- Static performance during review period

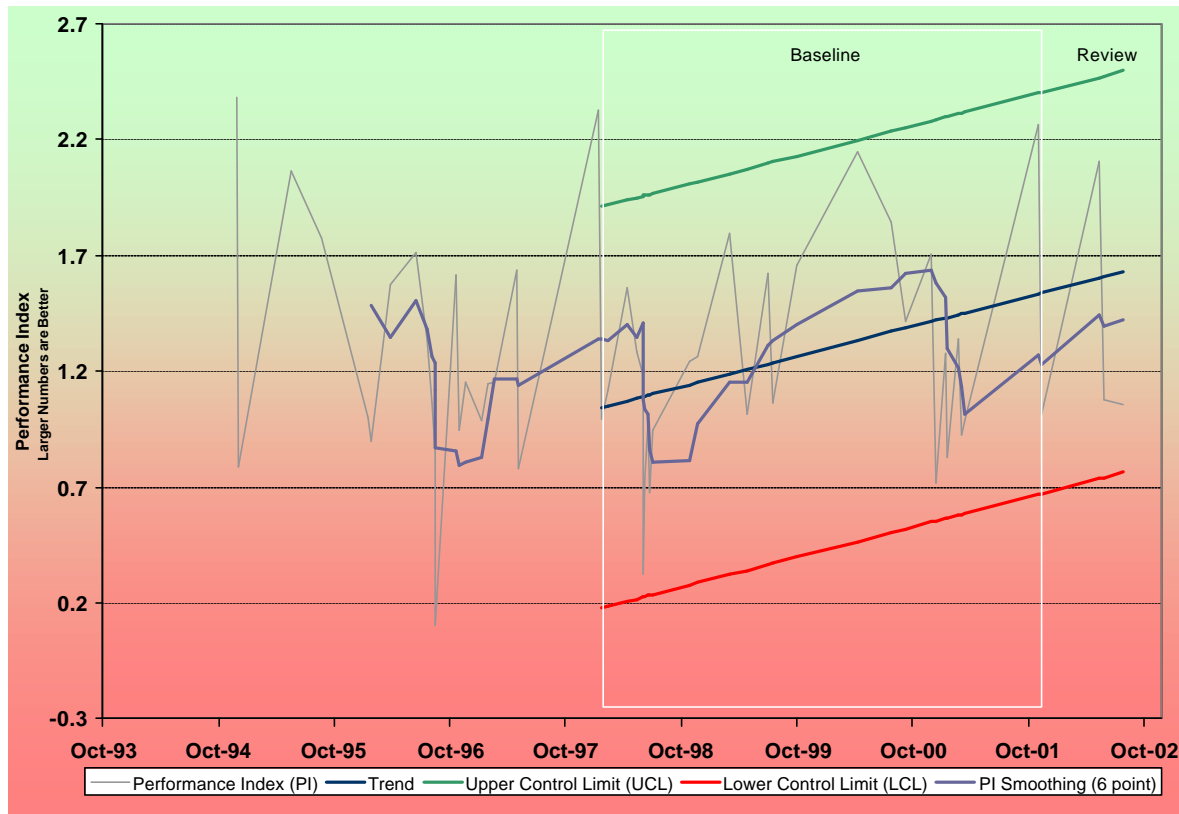
Type Distribution of ESA Occurrences



Occurrences by Type Baseline vs. Review

- Personnel Safety predominant type in both baseline and review—38% and 42% respectively
- Decrease of Radiological Protection to 17% in review period
- Emergence of Authorization Basis and Fire Protection
- Other historical ESA types disappear in review period

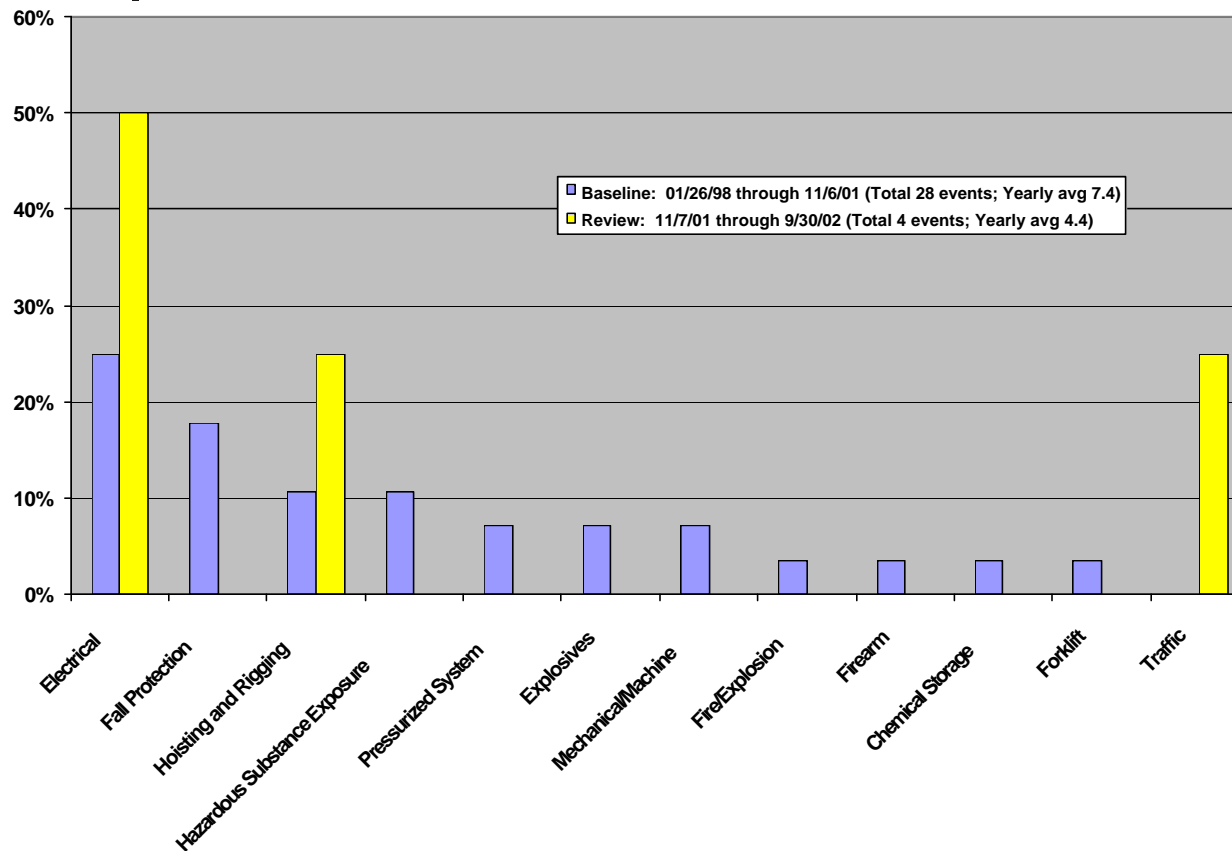
ESA Personnel Safety Occurrence Performance



Personnel Safety Control Chart
(1/94 to 10/02)

- 55 total events severity weighted 2, 3, or 4
 - Pre-Baseline: 23 events
 - Baseline: 28 events
 - Review: 4 events
- Improving performance during baseline period
- Continued improving performance during review period—no further evaluation

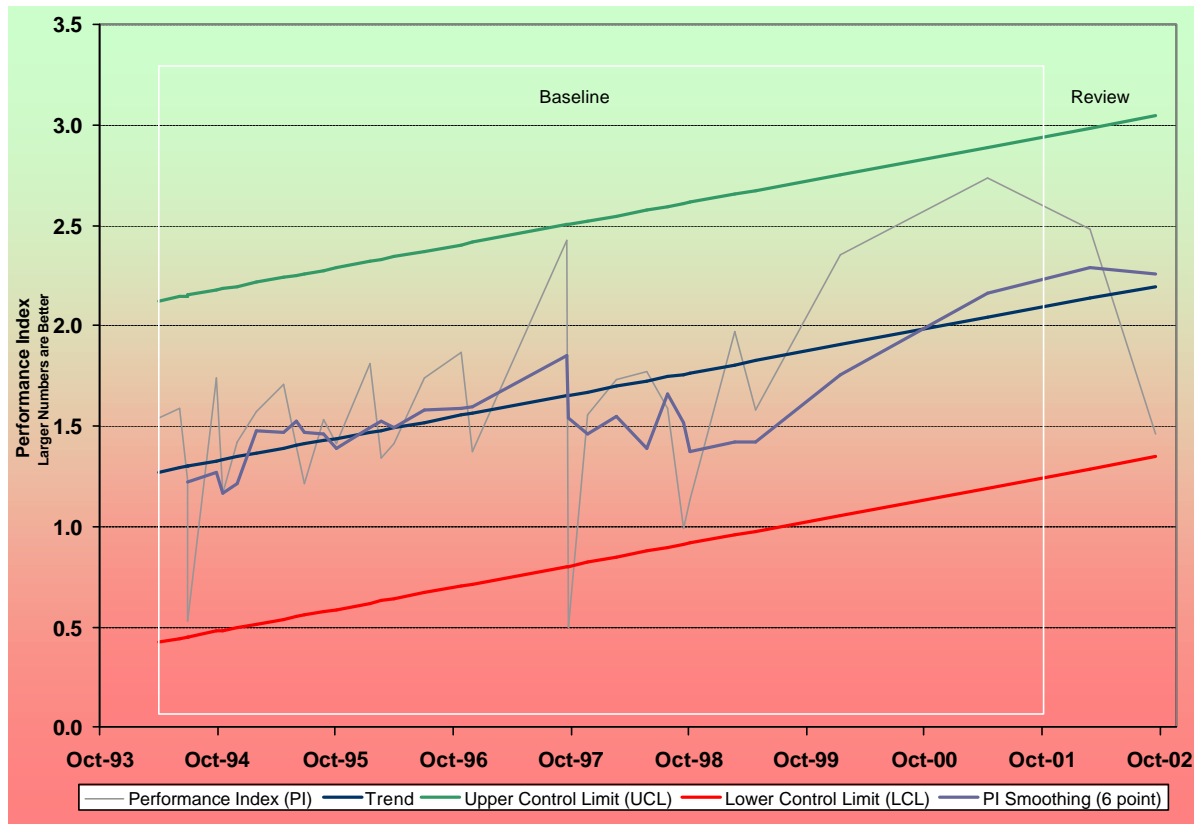
Types of ESA Personnel Safety Occurrences



ESA Personnel Safety Occurrences by Type Baseline vs. Review

- Electrical safety predominant type for both baseline and review periods
- Traffic and Hoisting and Rigging only other types of personnel safety events
- Drop-off in all other types of personnel safety events for review period

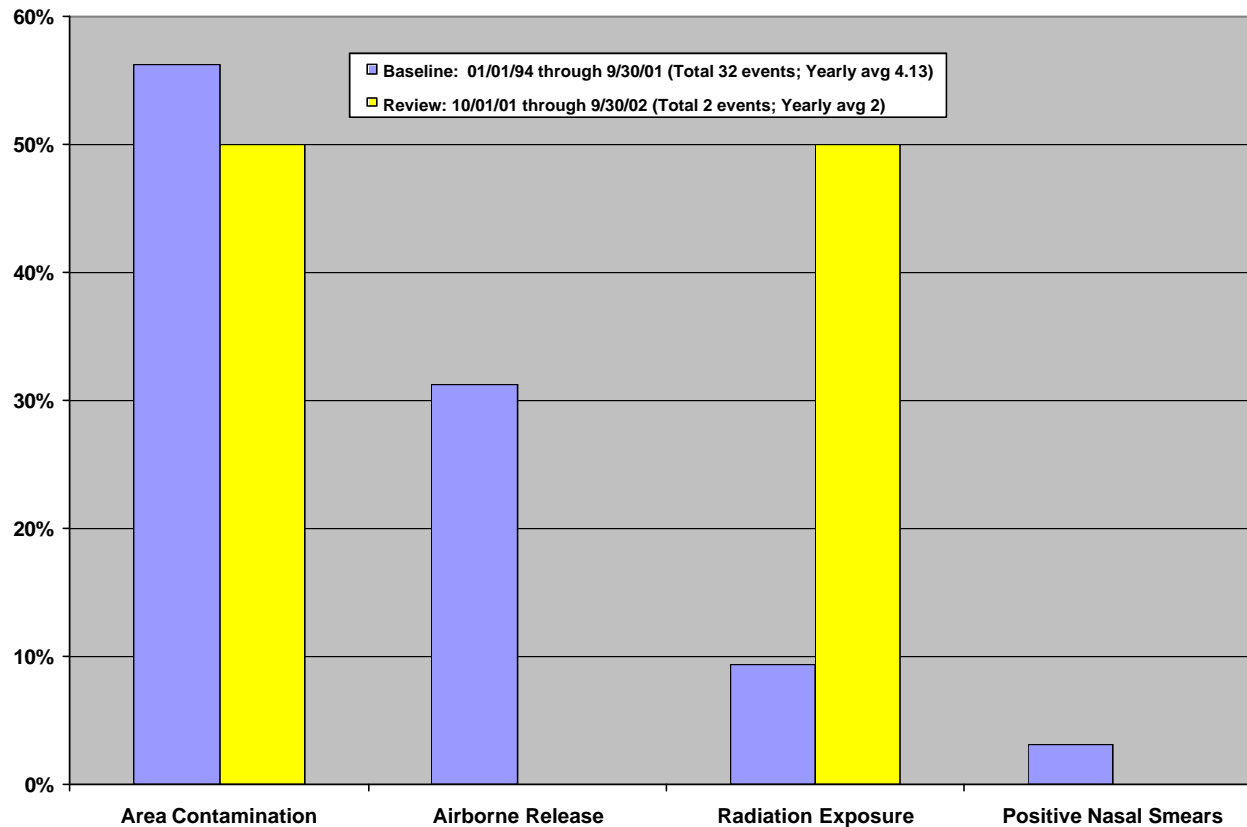
ESA Radiological Protection Occurrence Performance



Radiological Protection Control Chart (1/94 to 10/02)

- 34 total events severity weighted 2, 3, or 4
 - Baseline: 32 events
 - Review: 2 events
- Improving performance during baseline period
- Continued improving performance during review period—no further evaluation

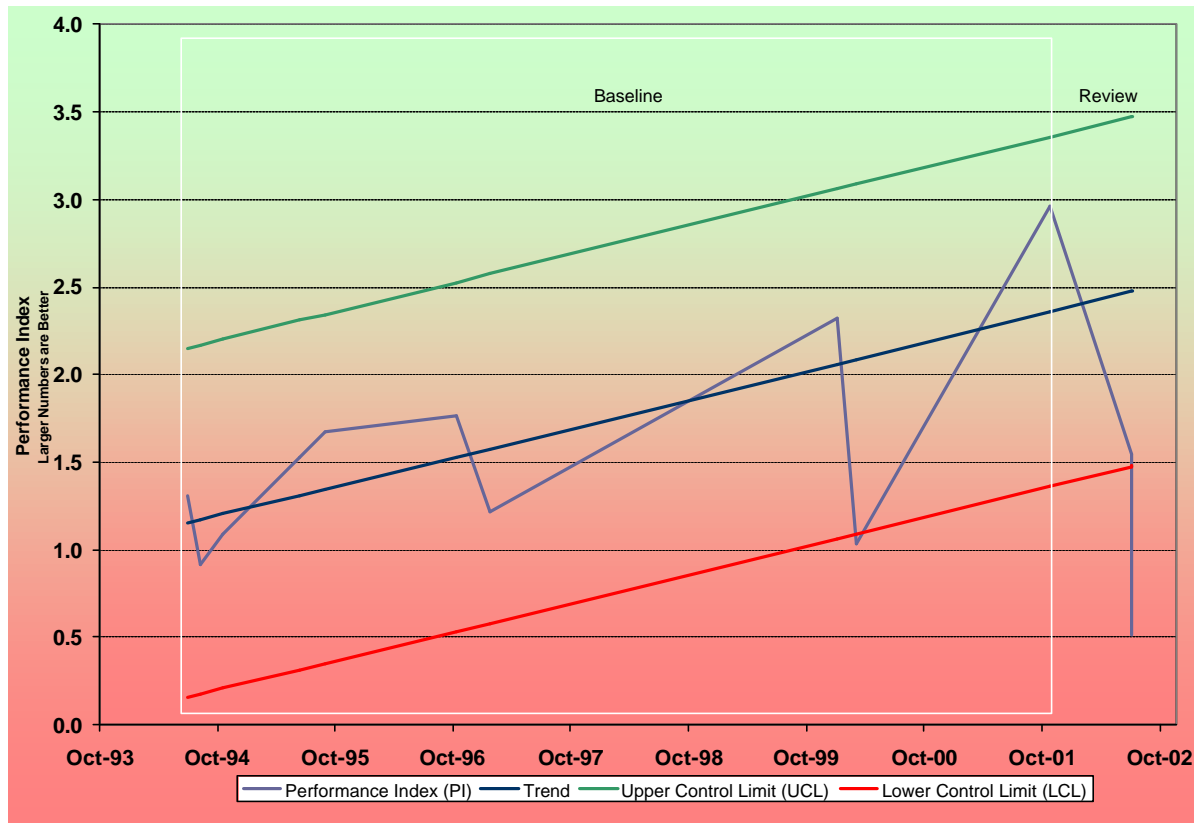
Types of ESA Radiological Protection Occurrences



ESA Radiological Protection Occurrences by Type Baseline vs. Review

- Area contamination predominant type for both baseline and review periods
- Emergence of Radiation Exposure in review period (1 event)
- Drop-off in Airborne Release and Positive Nasal Smear incidents

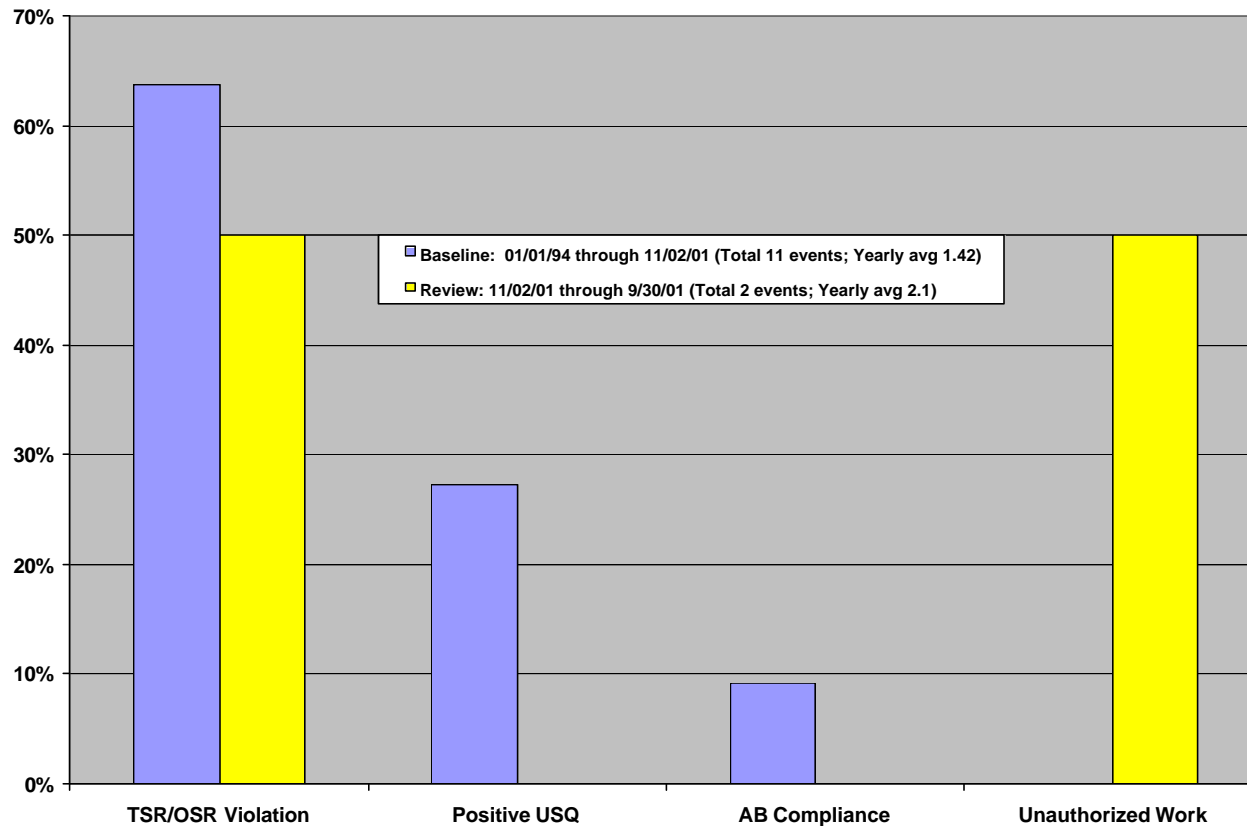
ESA Authorization Basis Occurrence Performance



Authorization Basis
Control Chart
(1/94 to 10/02)

- 13 total events severity weighted 2 or 3
 - Baseline: 11 events
 - Review: 2 events
- Improving performance during baseline period
- Declining performance during review period

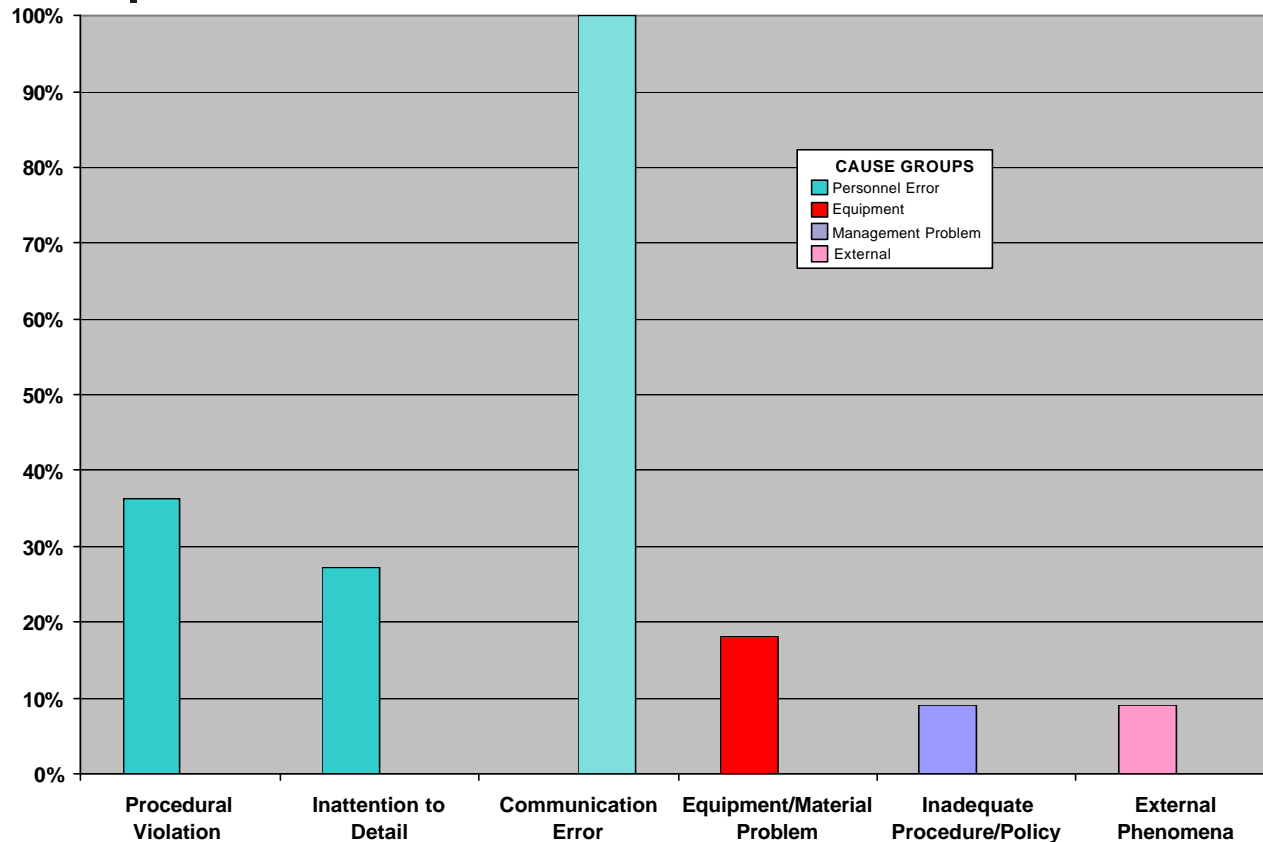
Types of ESA Authorization Basis Occurrences



ESA Authorization
Basis Occurrences by
Type
Baseline vs. Review

- TSR/OSR Violation predominant type historically and during baseline
- Emergence of Unauthorized Work in review period (1 event)
- Disappearance of other types of authorization basis events during review

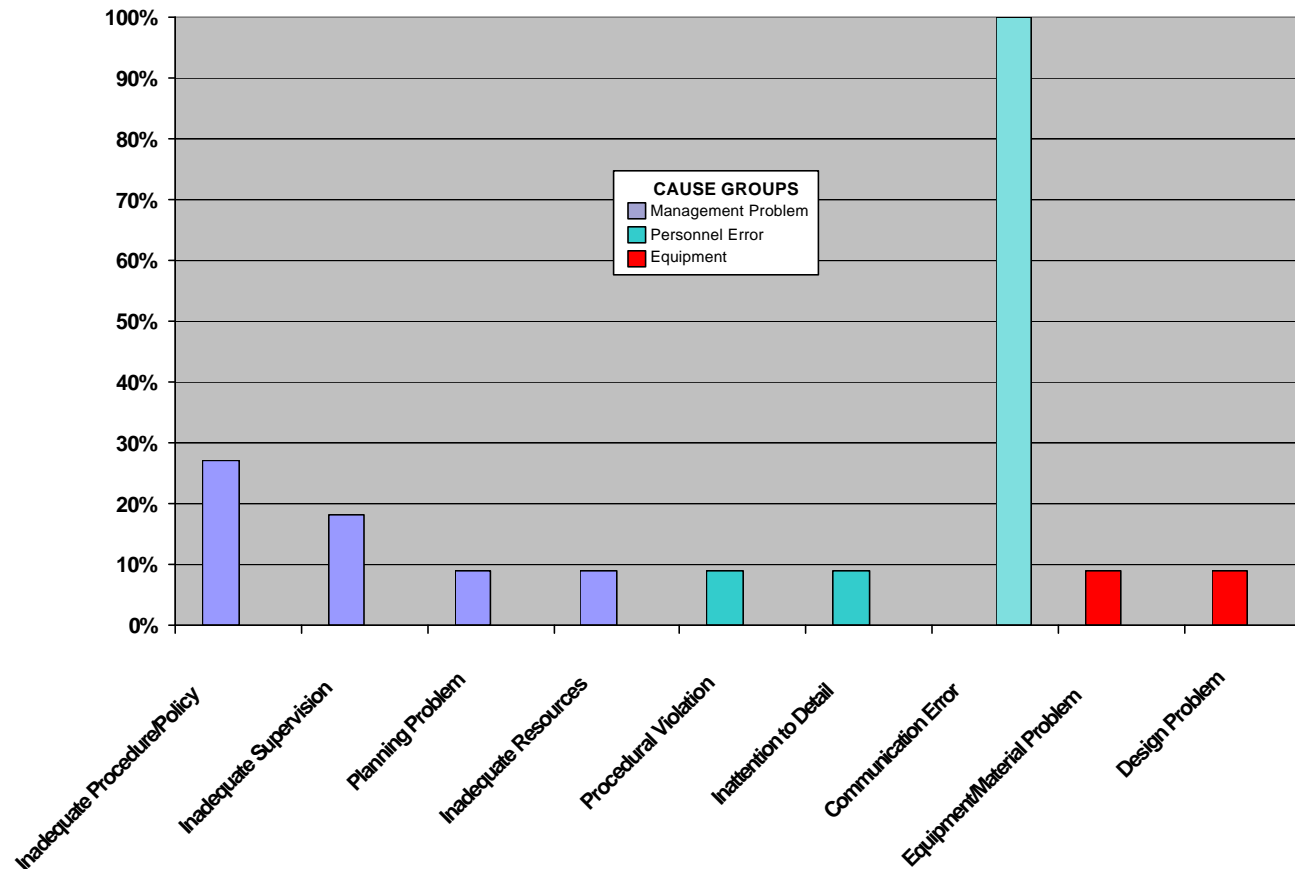
Direct Causes of ESA Authorization Basis Occurrences



Direct Causes Baseline vs. Review

- Personnel Error predominant direct cause for both baseline and review periods
- Communication error is 100% of personnel error-related causes in review period (2 events)

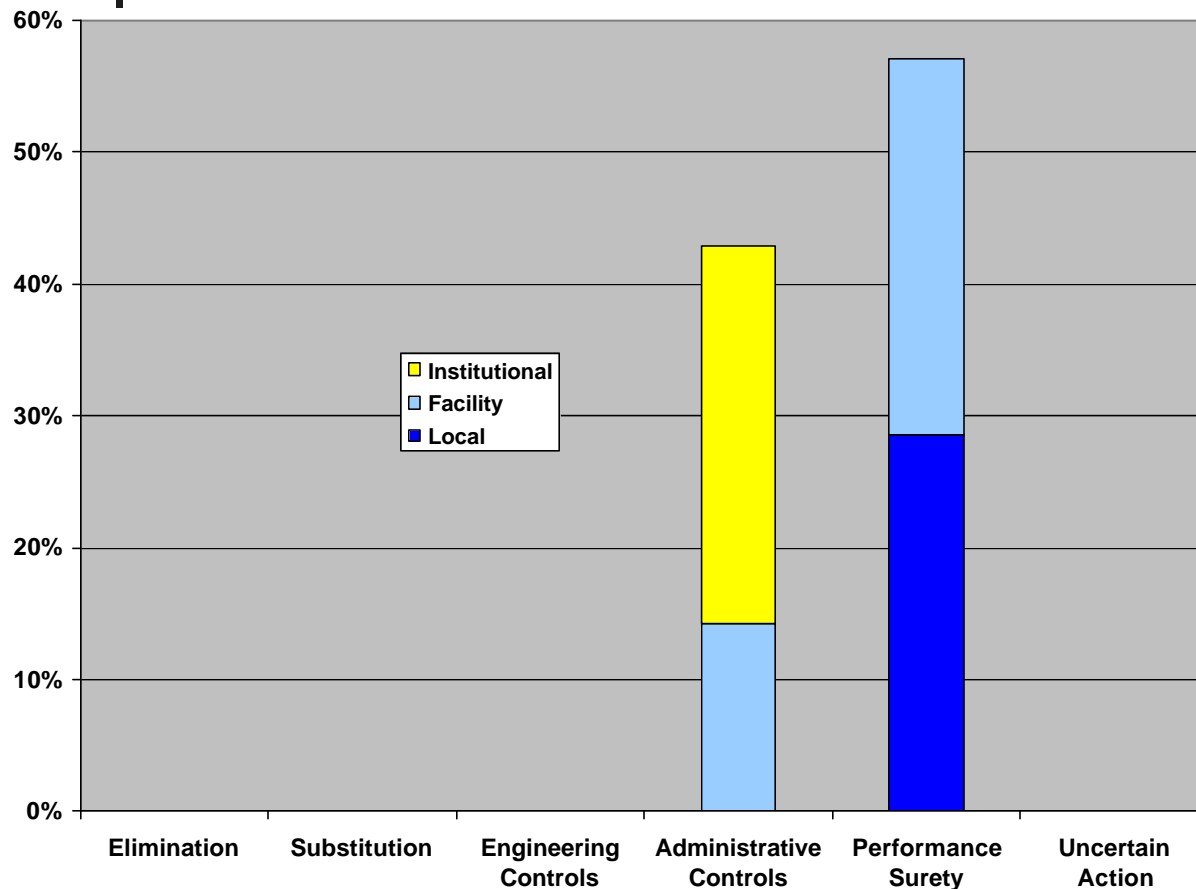
Root Causes of ESA Authorization Basis Occurrences



Root Causes Baseline vs. Review

- Management Problem principal type of historical occurrence—63% of total
- Communication errors principal type for review period—100% of total

Profile of ESA Corrective Actions for Authorization Basis



Corrective Actions (10/01/99 to 10/02)

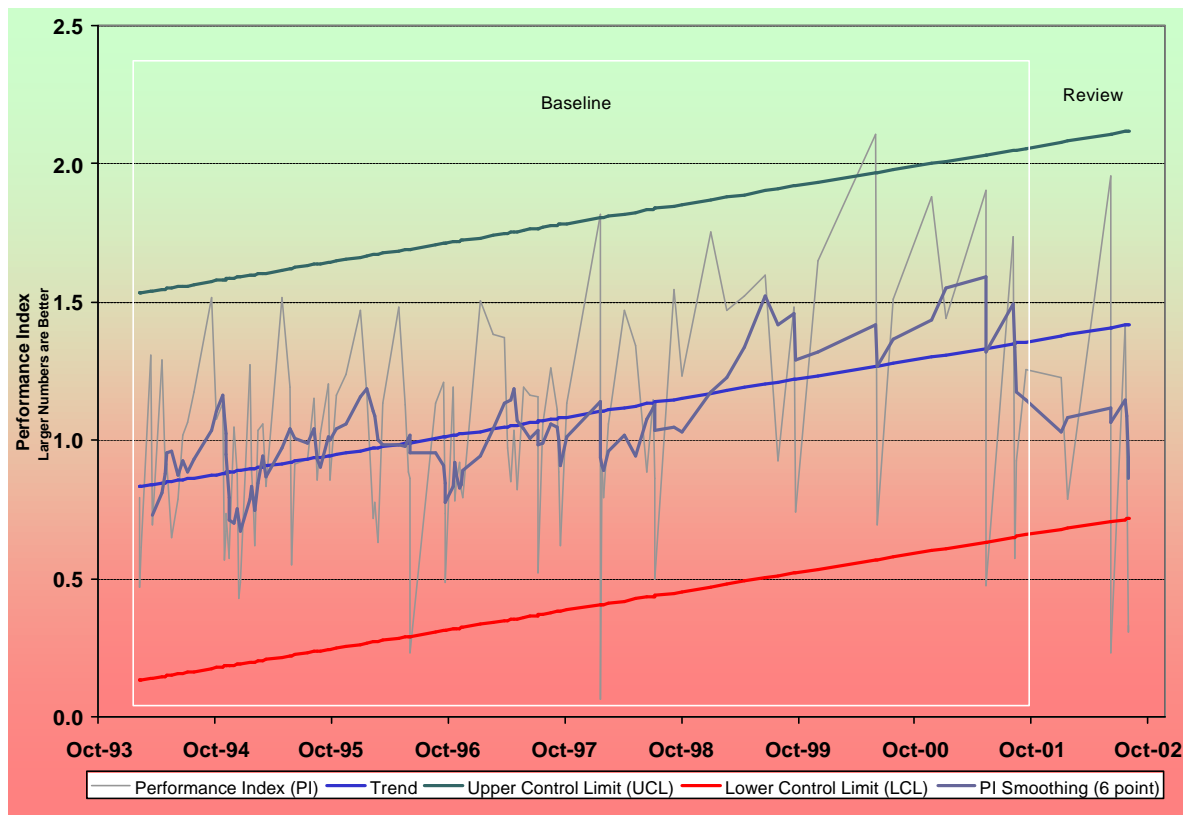
- No actions target eliminating or substituting for lesser hazard or modifying engineered barriers
- 29% of all actions targeted at institutional level
- Nearly 60% of all actions target “performance surety”—driven by direct and root causal patterns of personnel errors and inadequate procedures or policies



C Division Occurrences

FY2002

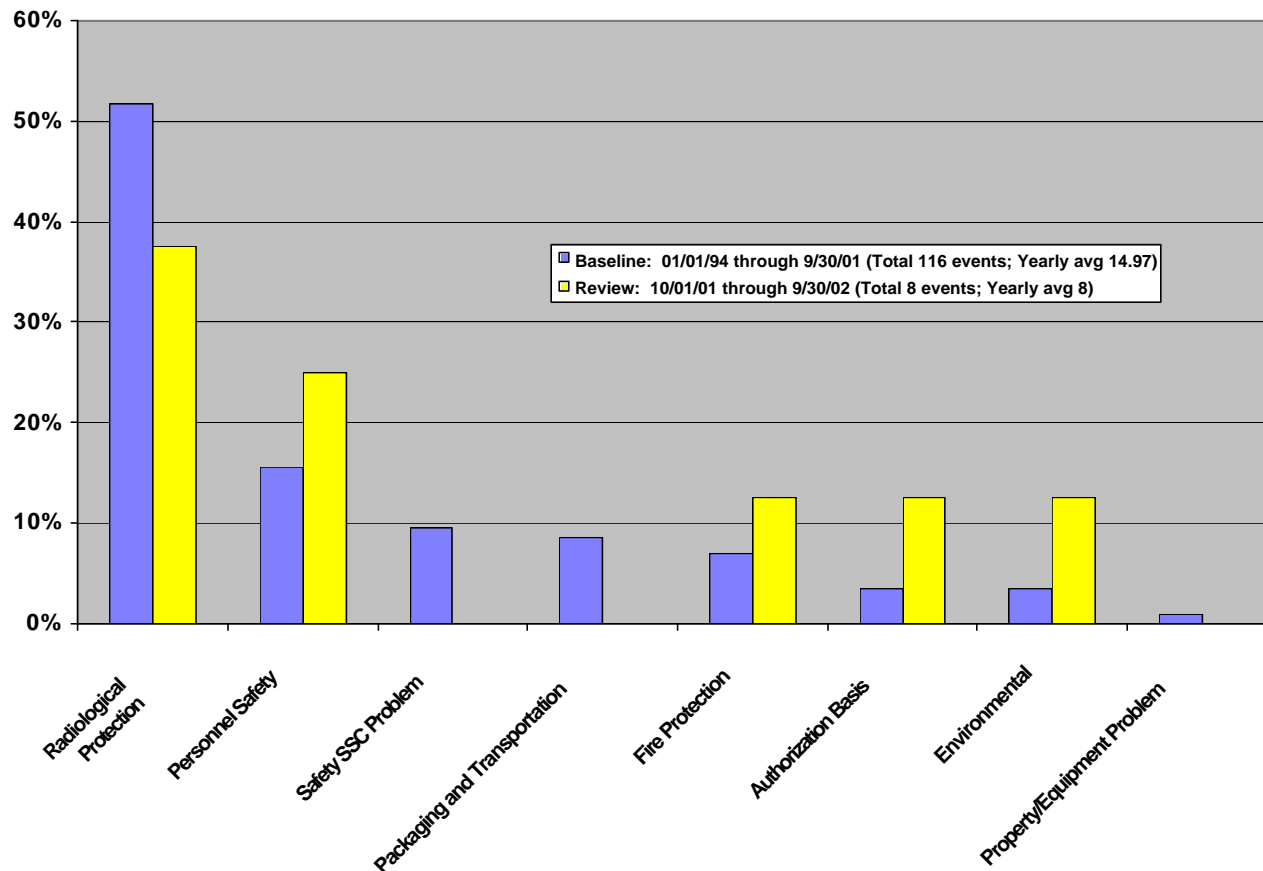
C Occurrence Performance



C PI Control Chart
(1/94 to 10/02)

- 124 total events severity weighted 2, 3, or 4
 - Baseline: 116 events
 - Review: 8 events
- Improving performance during baseline period
- Static performance during review period

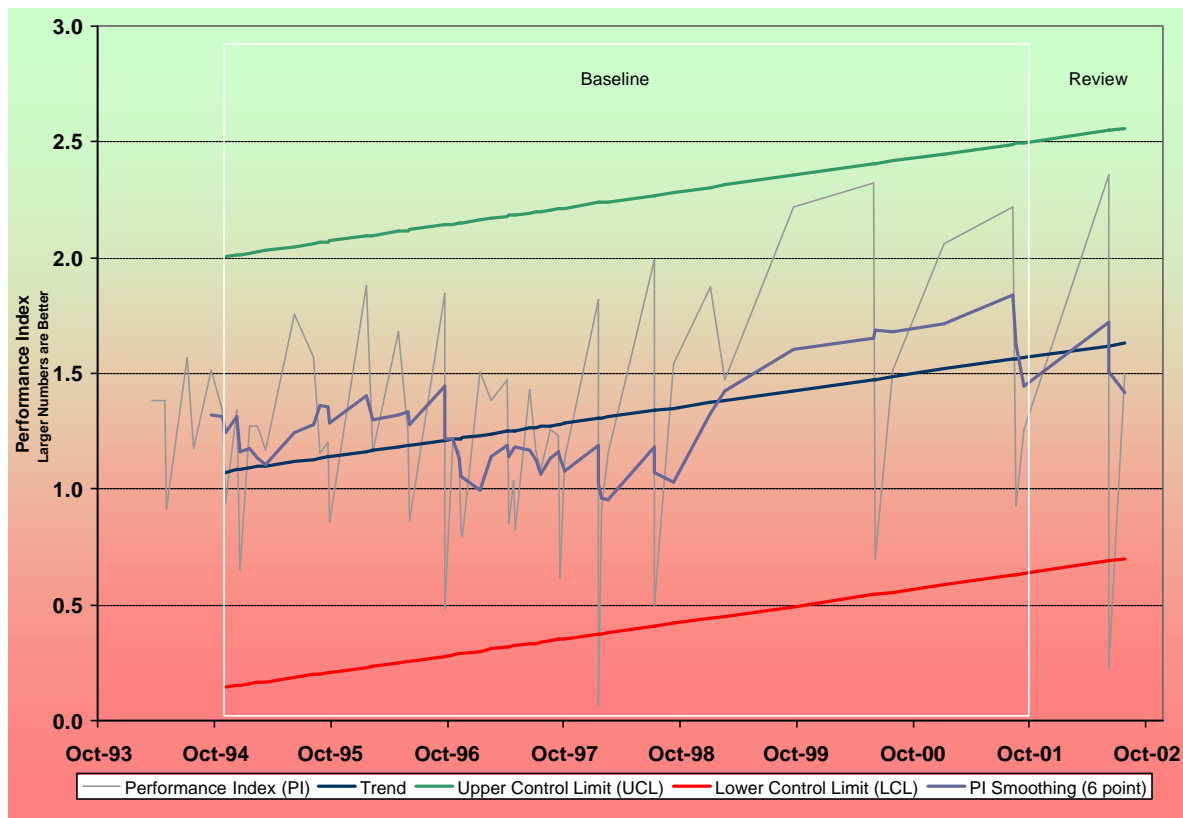
Type Distribution of C Occurrences



Occurrences by Type Baseline vs. Review

- Radiological Protection predominant type in both baseline and review periods—52% and 38% respectively
- Increase of Personnel Safety from 16% of baseline to 25% of review period
- Increase of Fire Protection, Authorization Basis, and Environmental in review period

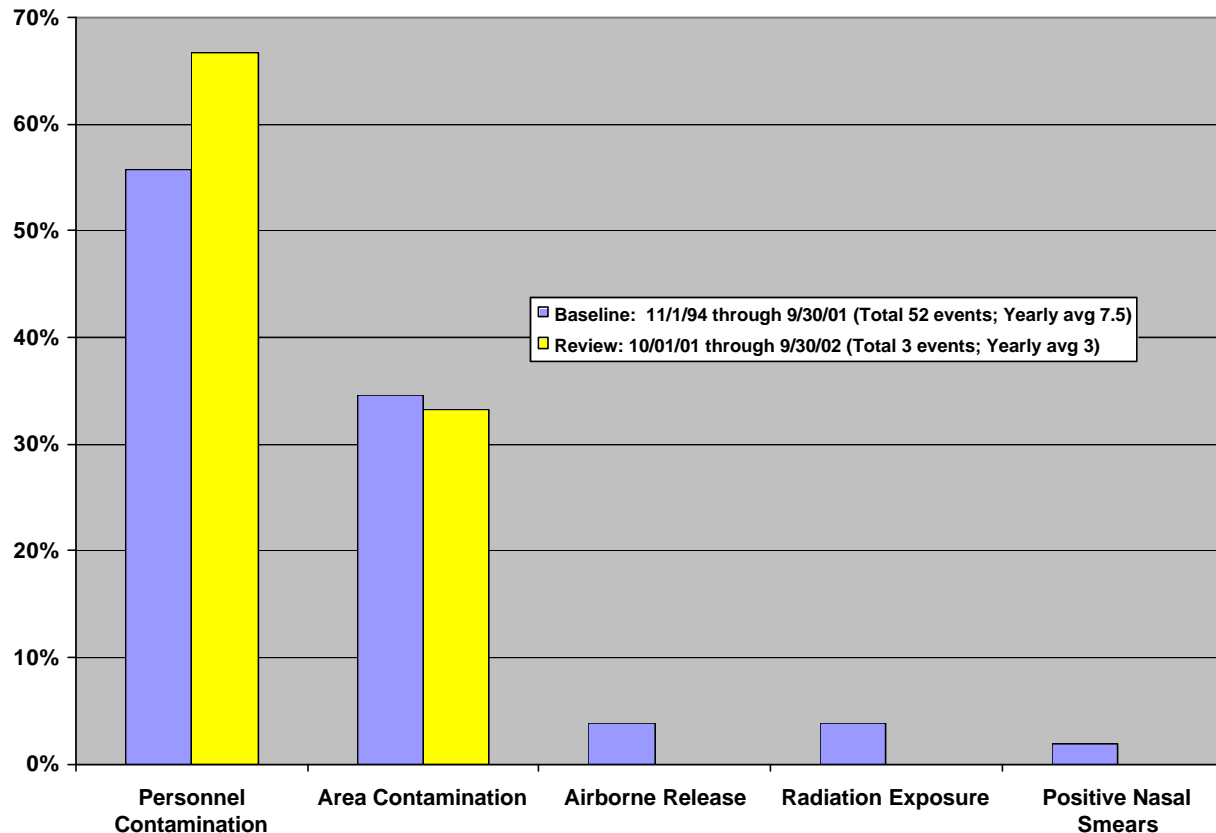
C Radiological Protection Occurrence Performance



Radiological Protection Control Chart (1/94 to 10/02)

- 63 total events severity weighted 2, 3, or 4
 - Pre-Baseline: 8 events
 - Baseline: 52 events
 - Review: 3 events
- Improving performance during baseline period
- Continued improving performance during review period—no further evaluation

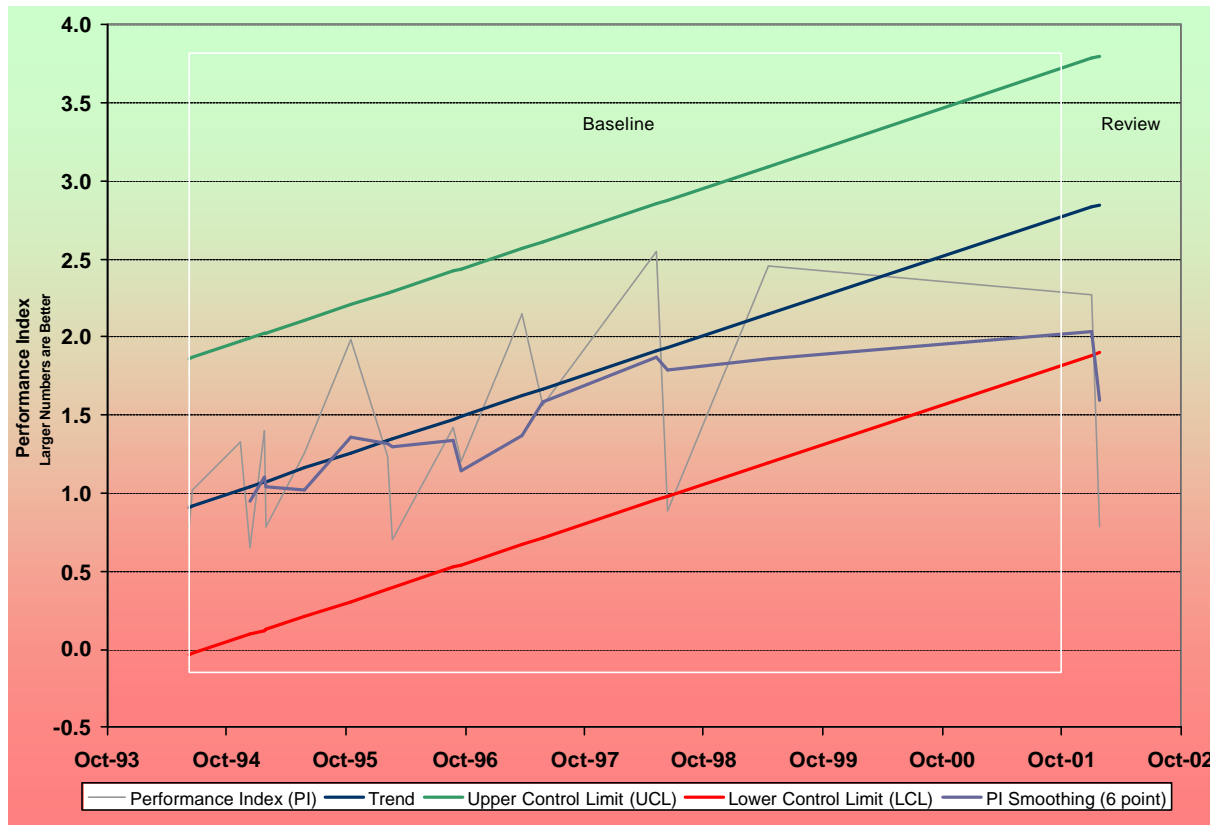
Types of C Radiological Protection Occurrences



C Radiological Protection Occurrences by Type Baseline vs. Review

- Personnel contamination predominant type for baseline and review—56% and 67% respectively
- Area contamination static at approximately 35% for baseline and review
- Drop-off in Airborne Release, Radiation Exposure, and Positive Nasal Smear incidents

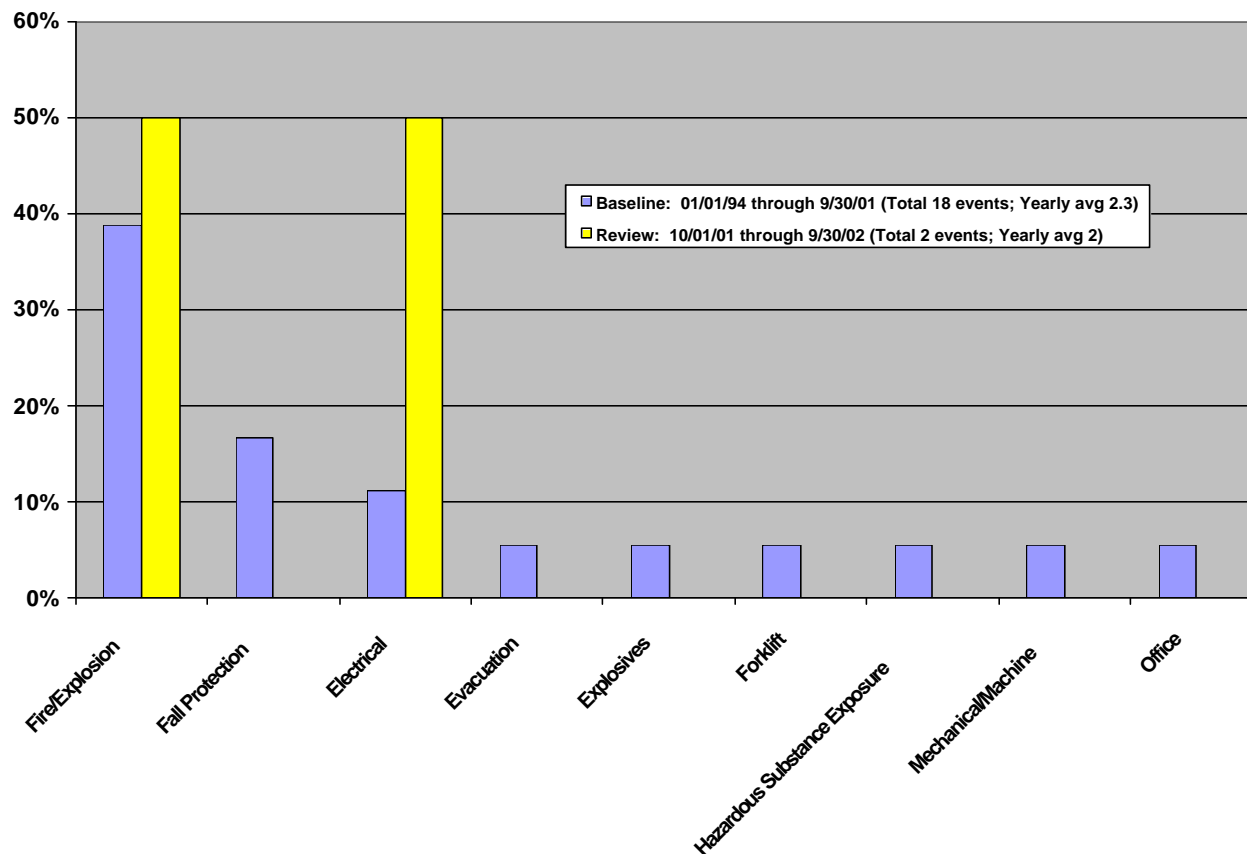
C Personnel Safety Occurrence Performance



Personnel Safety Control Chart
(1/94 to 10/02)

- 20 total events severity weighted 2, 3, or 4
 - Baseline: 18 events
 - Review: 2 events
- Improving performance during baseline period
- Static performance during review period

Types of C Personnel Safety Occurrences



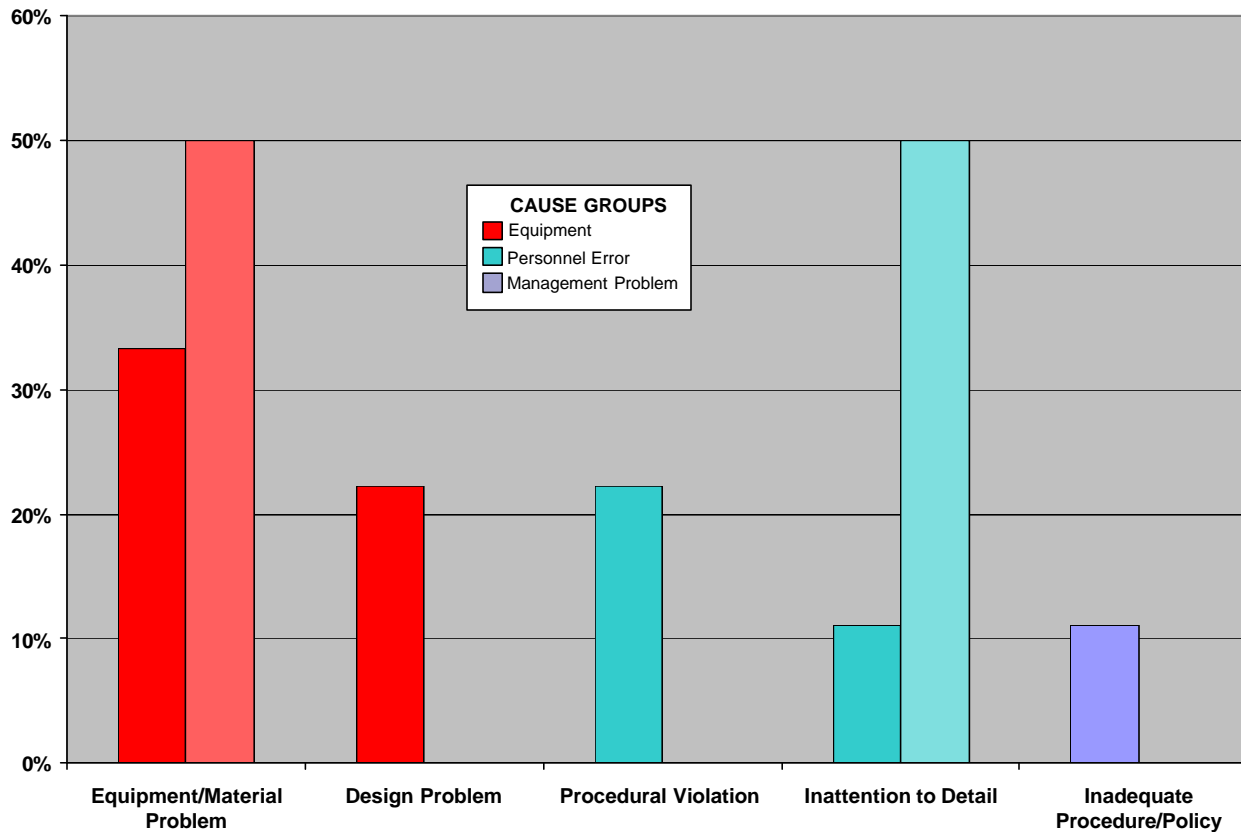
C Personnel Safety Occurrences by Type Baseline vs. Review

- Fire/Explosion predominant type for both baseline and review—39% and 50% respectively
- Increase in percentage of Electrical in review period (1 event)
- Drop-off in percentage of other types of personnel safety events for review period

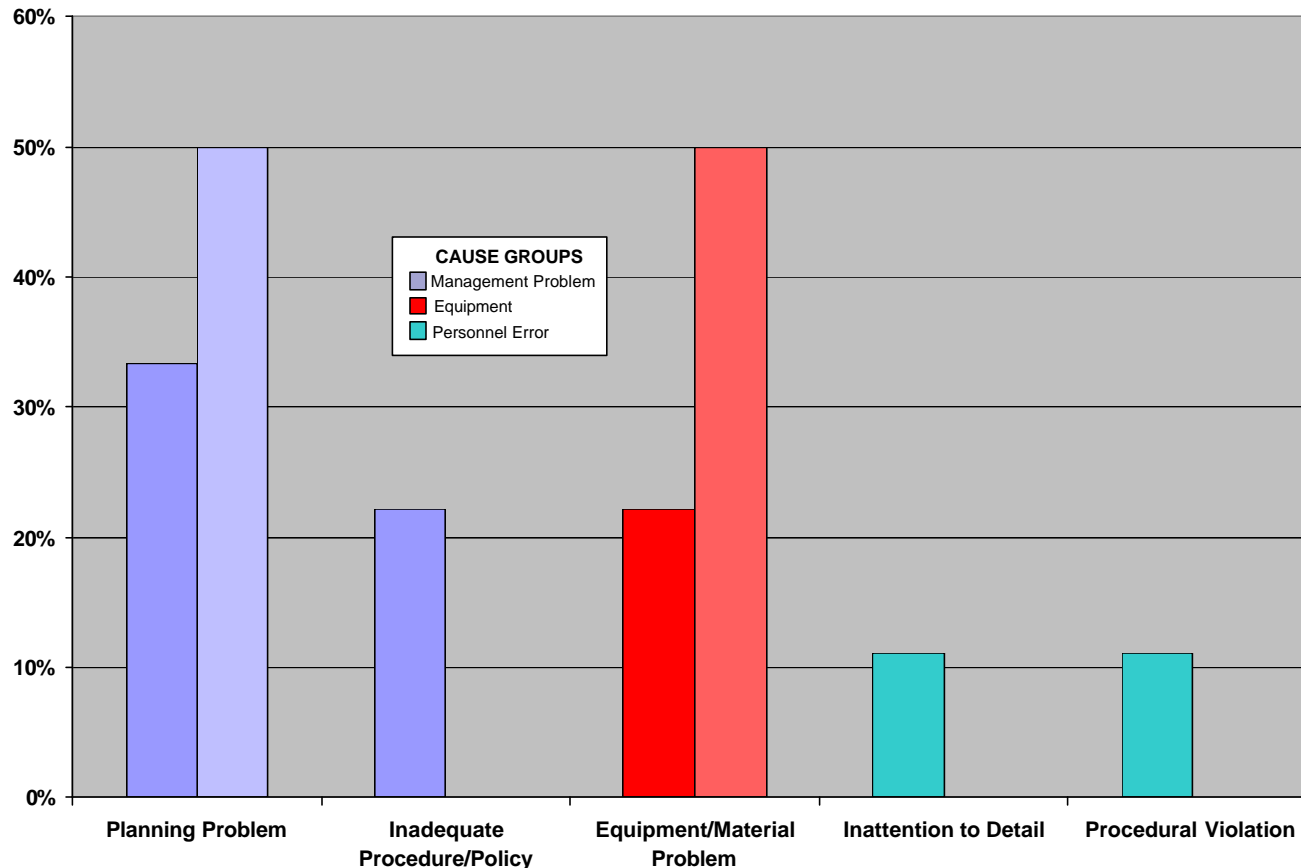
Direct Causes of C Selected Personnel Safety Occurrences

Direct Causes of
Fire/Explosion &
Electrical
Occurrences
Baseline vs. Review

- Principal baseline direct causes are Equipment Problems and Personnel Error—55% and 33% respectively
- Equipment Problems and Personnel Error remain principal direct causes for review period



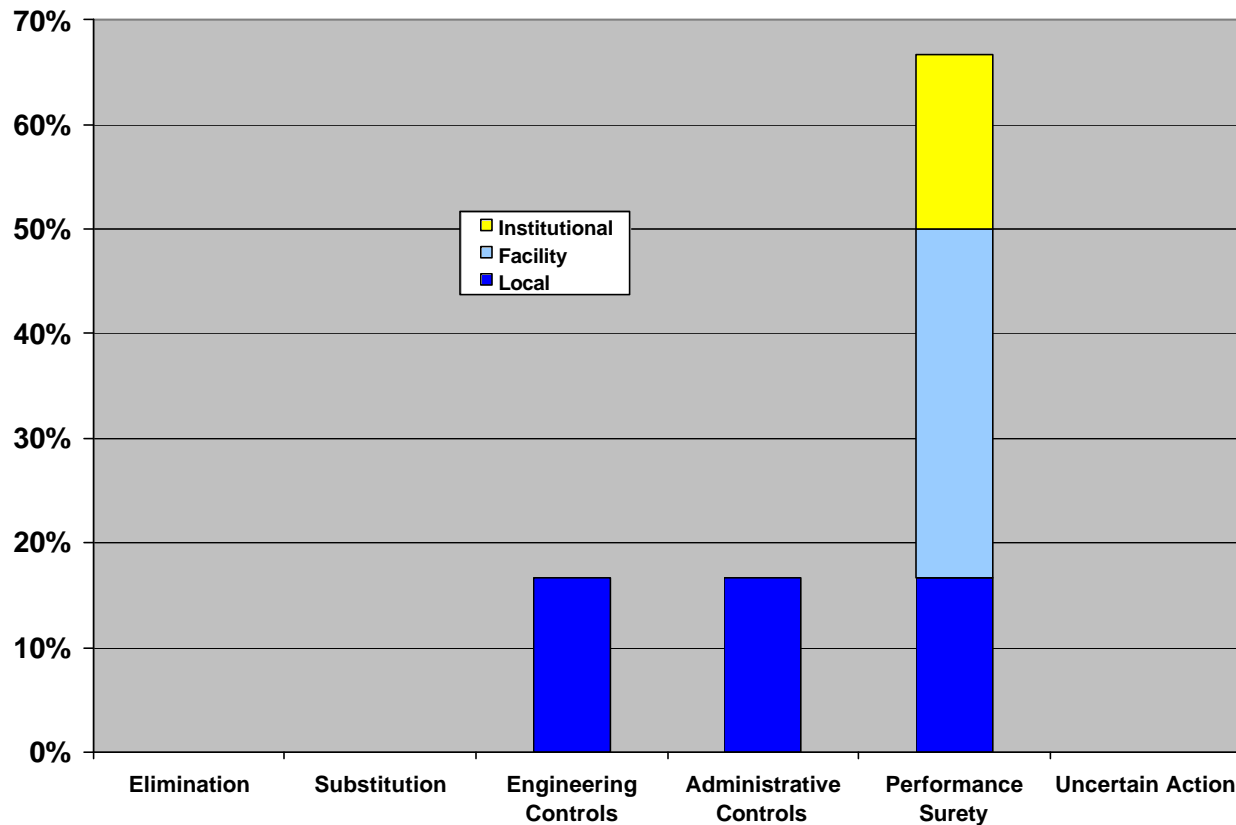
Root Causes of C Selected Personnel Safety Occurrences



Root Causes of
Fire/Explosion &
Electrical
Occurrences
Baseline vs. Review

- Management and Equipment Problems are principal root causes in baseline and review period
- Disappearance of Personnel Error-related root causes in review period

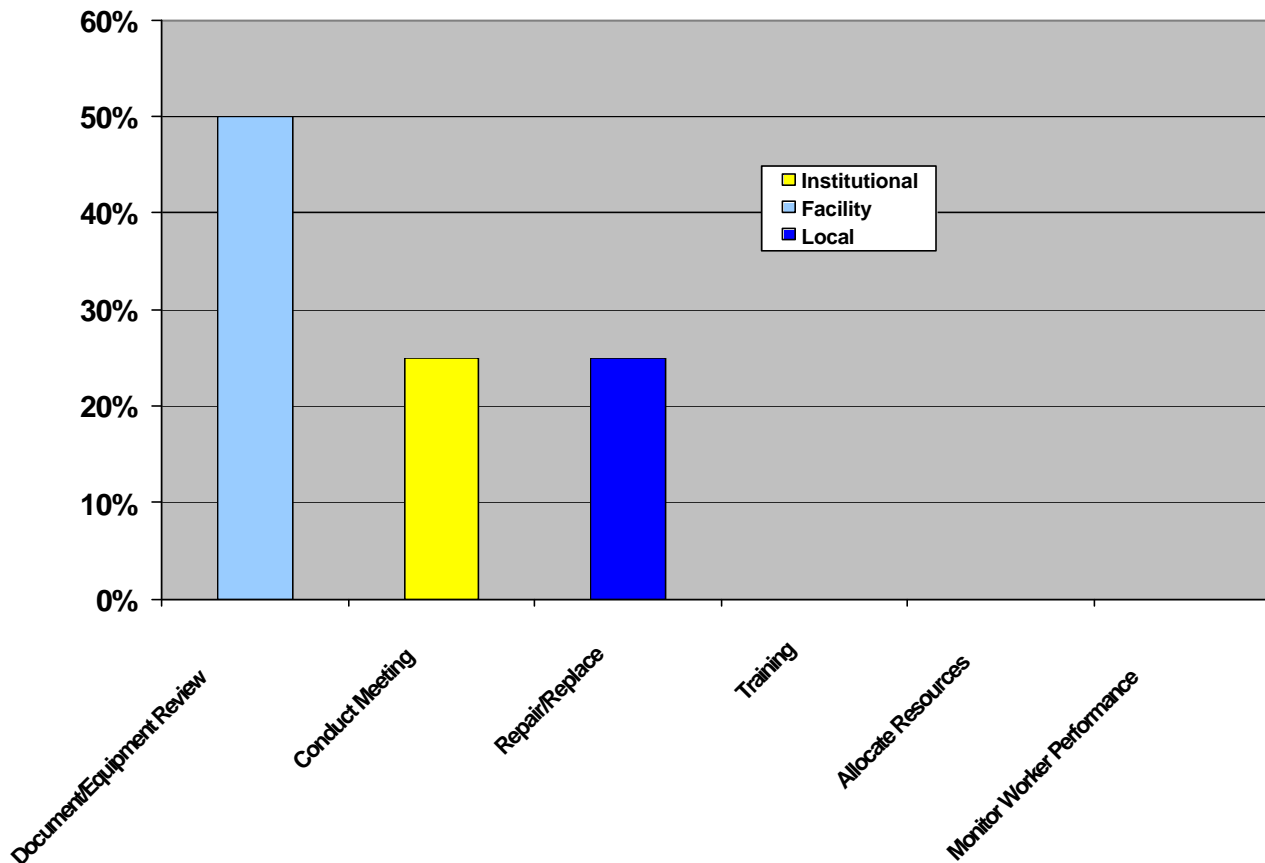
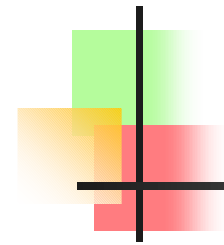
Profile of C Corrective Actions for Selected Personnel Safety Events



Corrective Actions for Fire/Explosion & Electrical Occurrences (10/01/99 to 10/02)

- No actions target eliminating or substituting for lesser hazard
- About 17% specify new or modified engineering barriers
- About 83% of all actions target procedural changes or "performance surety"—driven by causal patterns of personnel errors and inadequate procedures

C Performance Surety Actions for Selected Personnel Safety Events



Performance Surety Actions for Fire/Explosion & Electrical Occurrences (10/01/99 to Present)

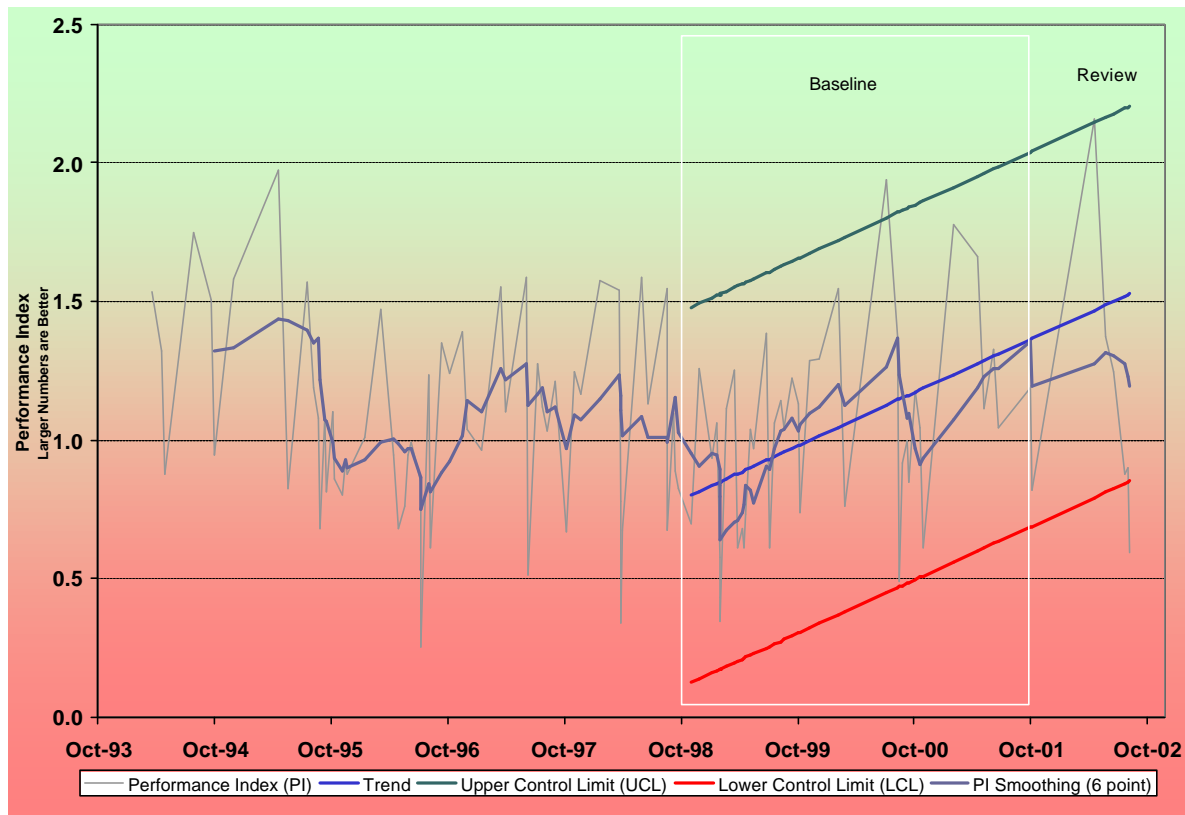
- 50% of actions involve Document/Equipment reviews, and 25% involve local repairs of equipment—matching predominance of Equipment Problems in direct and root causes
- 25% of actions involve meetings at institutional level
- Absence of training, resource allocation, and monitoring of worker performance



LANSCCE Division Occurrences

FY2002

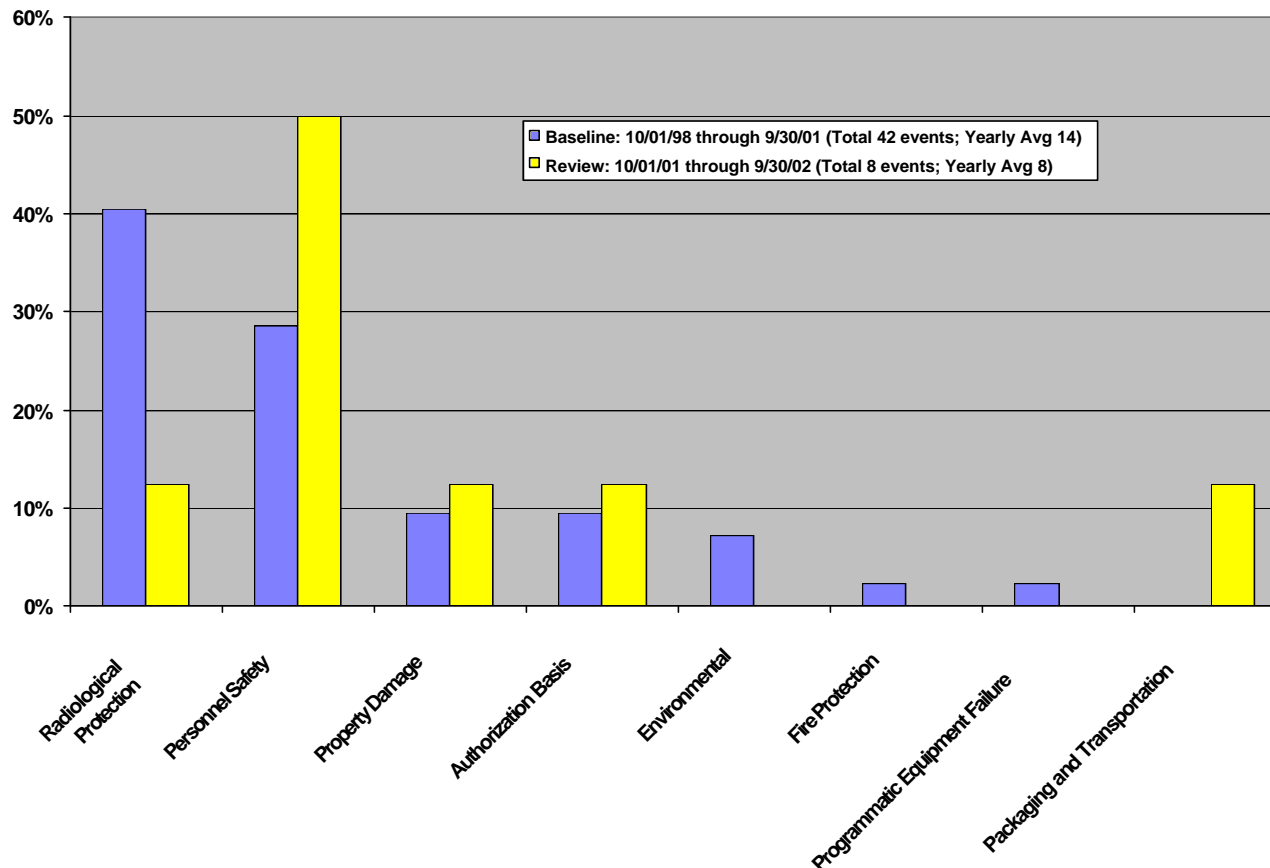
LANSCCE Occurrence Performance



LANSCCE PI Control Chart
(1/94 to 10/02)

- 110 events severity weighted 2, 3, or 4
 - Pre-Baseline: 60 events
 - Baseline: 42 events
 - Review: 8 events
- Improving performance since 1998
- Static performance during review period

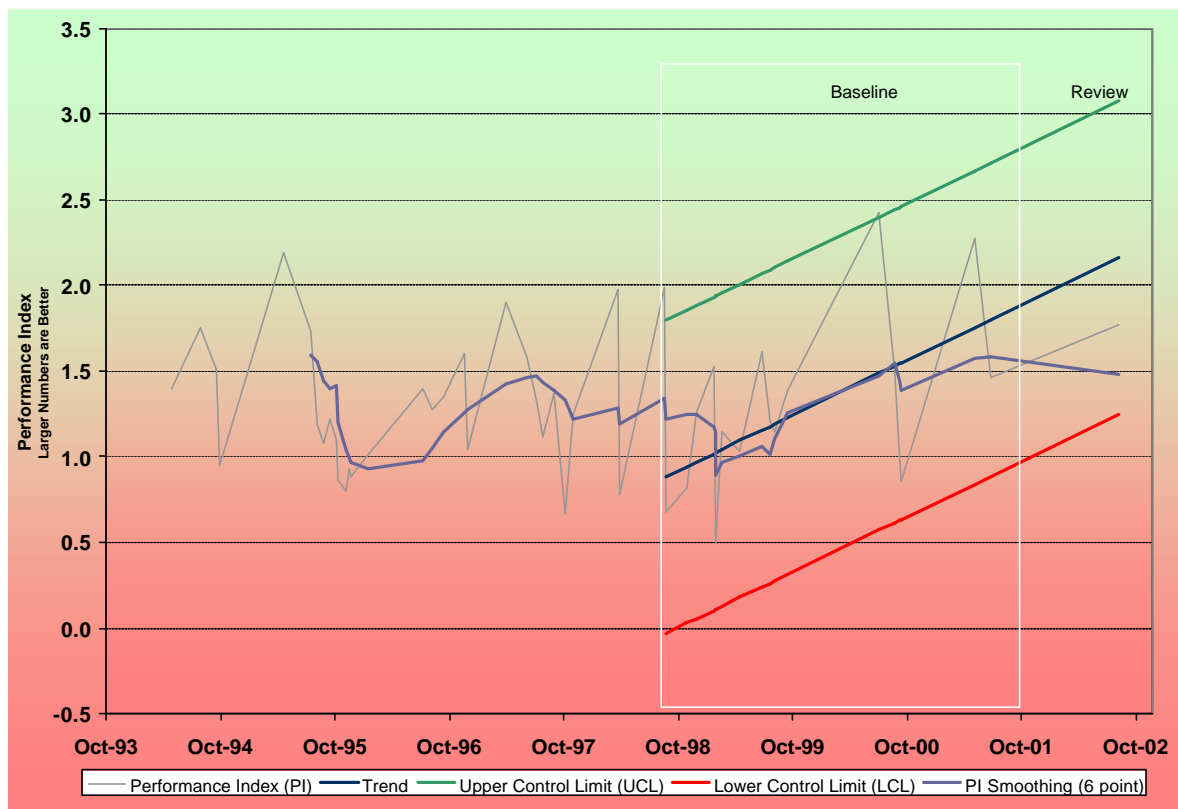
Type Distribution of LANSCE Occurrences



Occurrences by Type Baseline vs. Review

- Radiological Protection shows significant percentage decrease for review period—from 40% to 13%
- Increase in percentage of Personnel Safety events—from about 30% to 50%
- Static performance on authorization basis and property damage

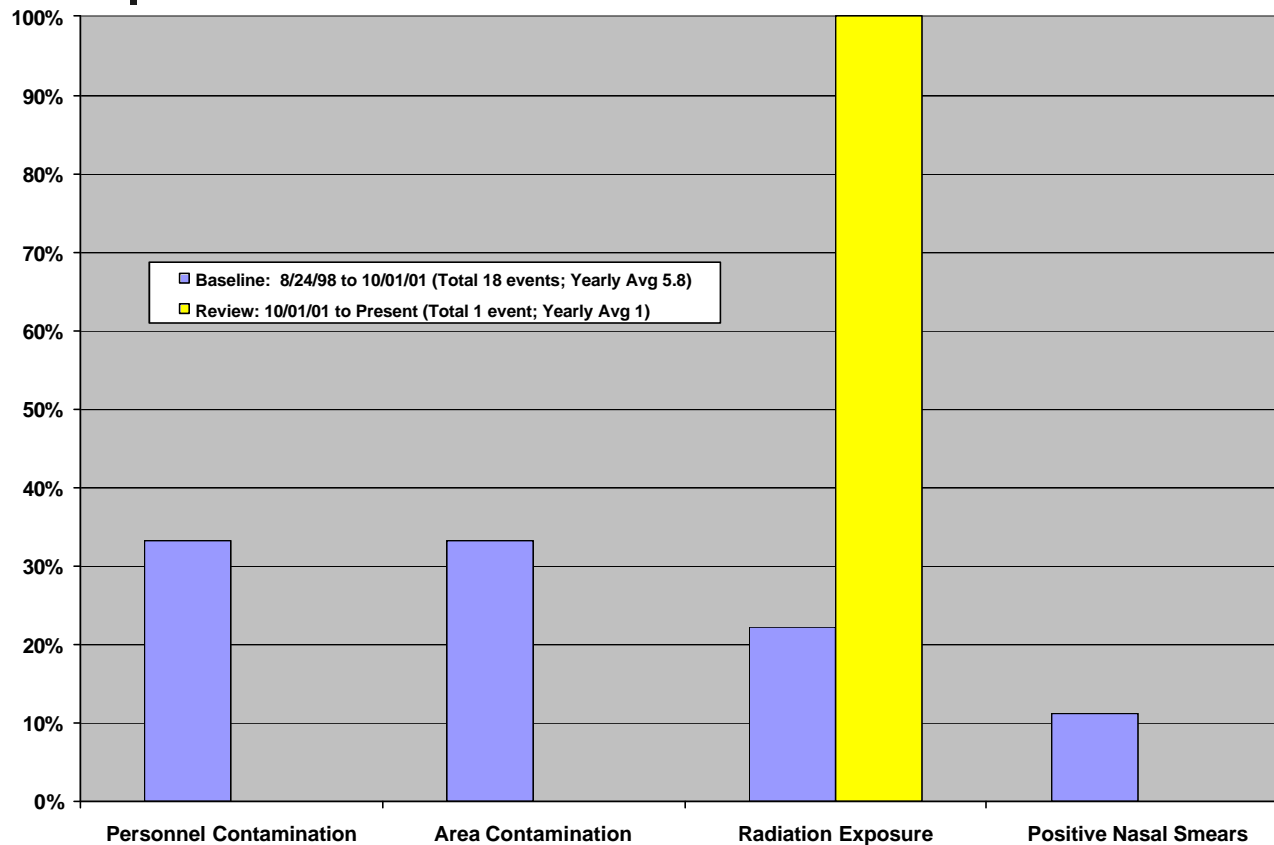
LANSCCE Radiological Protection Occurrence Performance



Radiological Protection Control Chart (10/99 to 10/02)

- 50 events severity weighted 2, 3, or 4
 - Pre-Baseline: 31 events
 - Baseline: 18 events
 - Review: 1 event
- Improving PI performance during baseline
- Continued improving performance during review period—no further evaluation

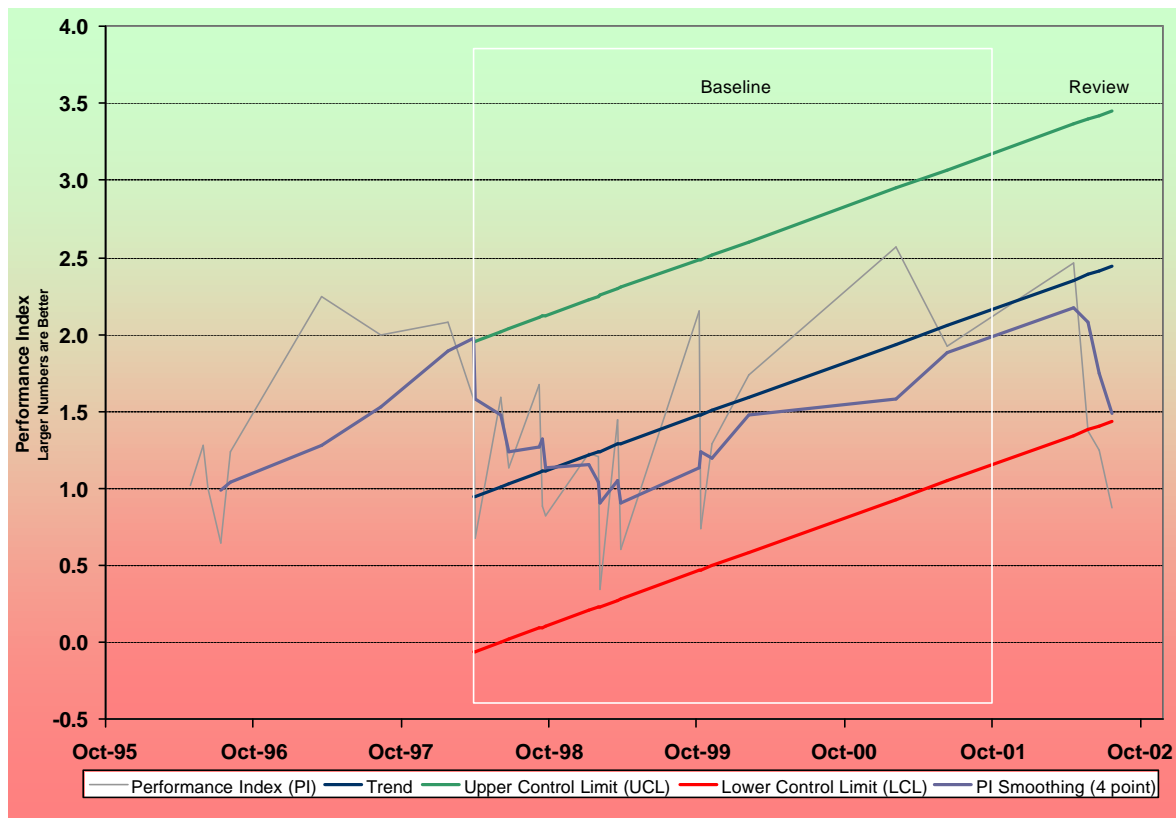
Types of LANSCE Radiological Protection Occurrences



LANSCE Radiological Occurrences by Type Baseline vs. Review

- Radiation Exposure accounts for 100% of radiological occurrences for review period—only 1 event
- Disappearance of other predominant types of historical radiological occurrences

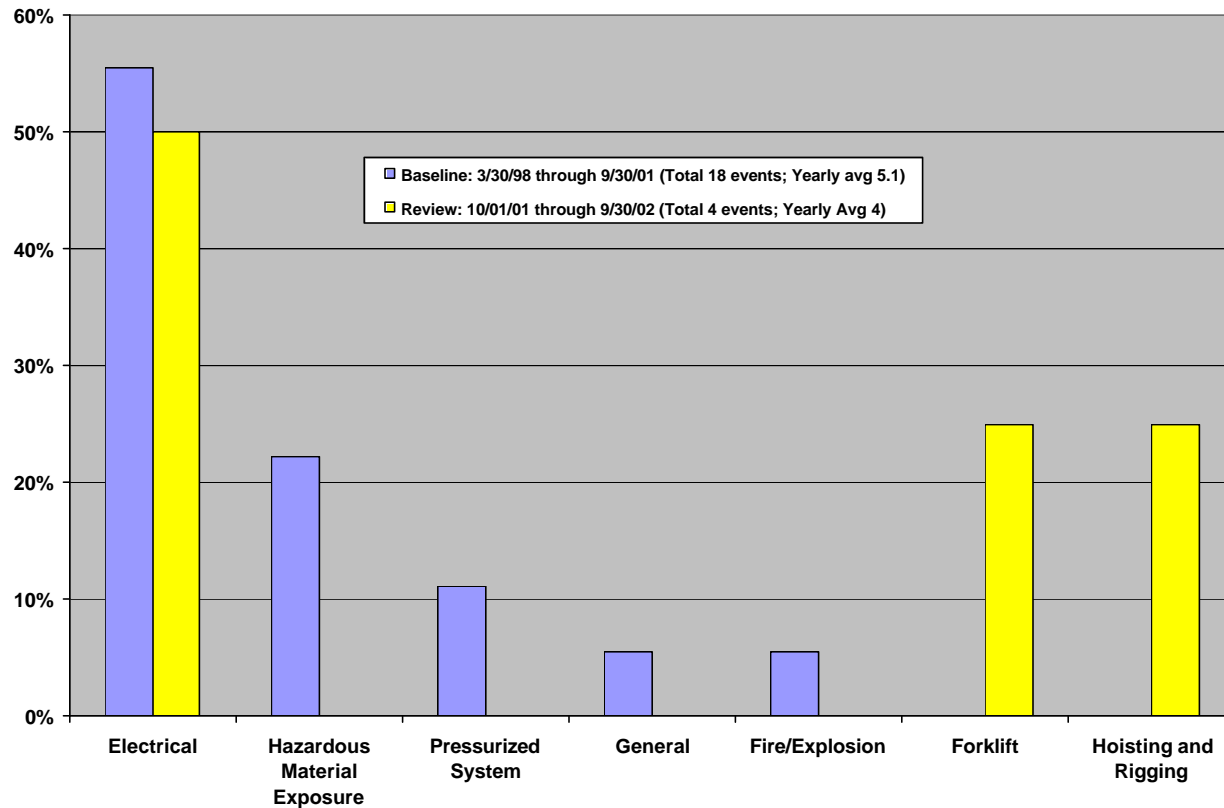
LANSCCE Personnel Safety Occurrence Performance



Personnel Safety Control Chart
(10/95 to 10/02)

- 31 events severity weighted 2, 3, or 4
 - Pre-Baseline: 9 events
 - Baseline: 18 events
 - Review: 4 events
- Improving performance during baseline
- Static performance during review period

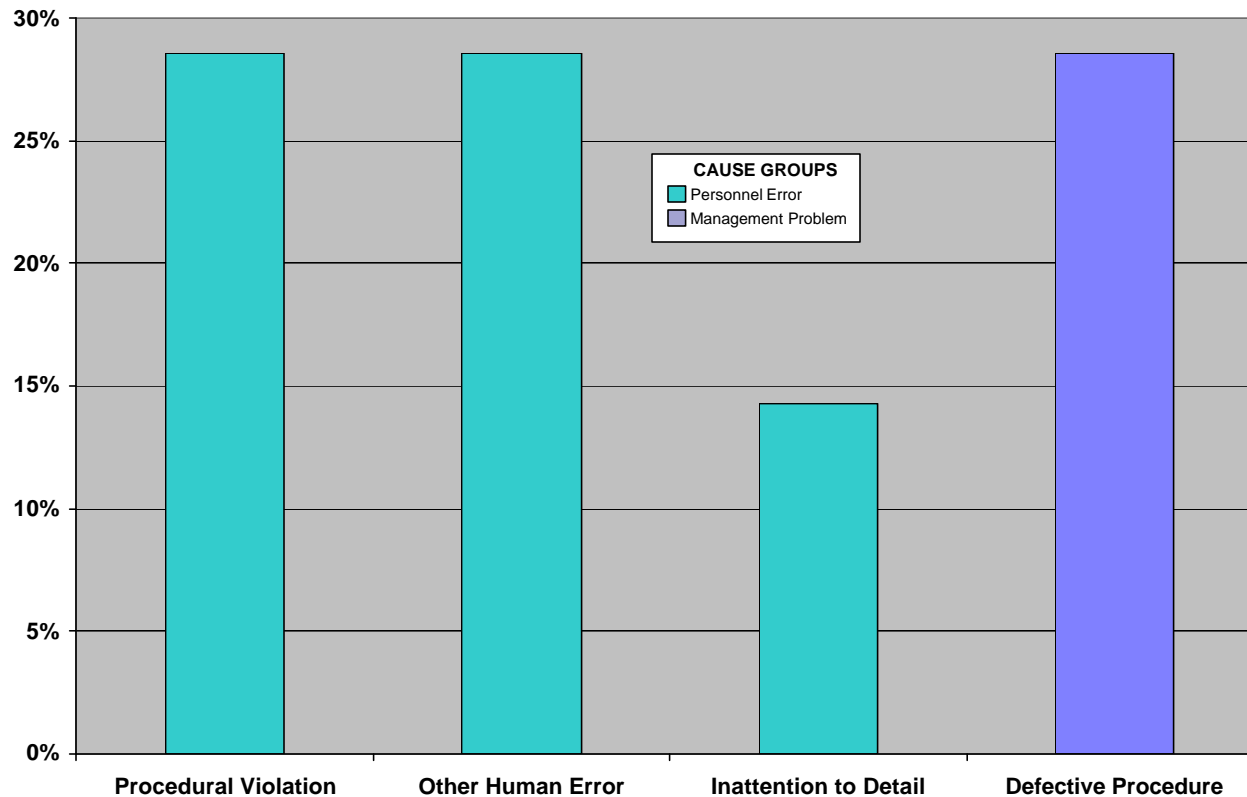
Types of LANSCE Personnel Safety Occurrences



LANSCE Personnel Safety Occurrences by Type
Baseline vs. Review

- Electrical Safety accounts for approximately 50% of total for both baseline and review
- Emergence of Forklift and Hoisting and Rigging events
- Disappearance of other personnel safety types

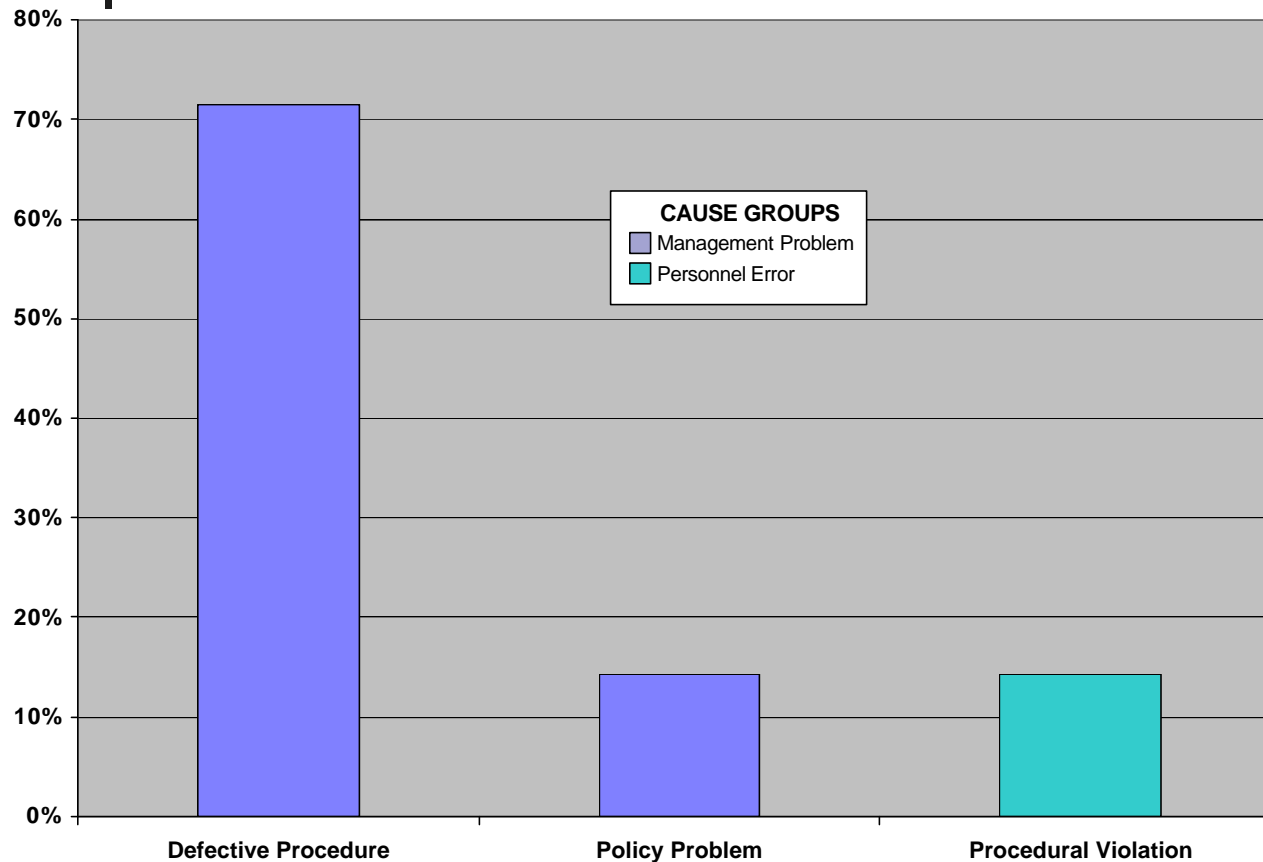
Direct Causes of LANSCE Electrical Occurrences



Direct Causes Baseline and Review

- Personnel Error predominant type of direct cause for LANSCE electrical occurrences—72% of total
- Defective Procedures are the sole management-related direct cause

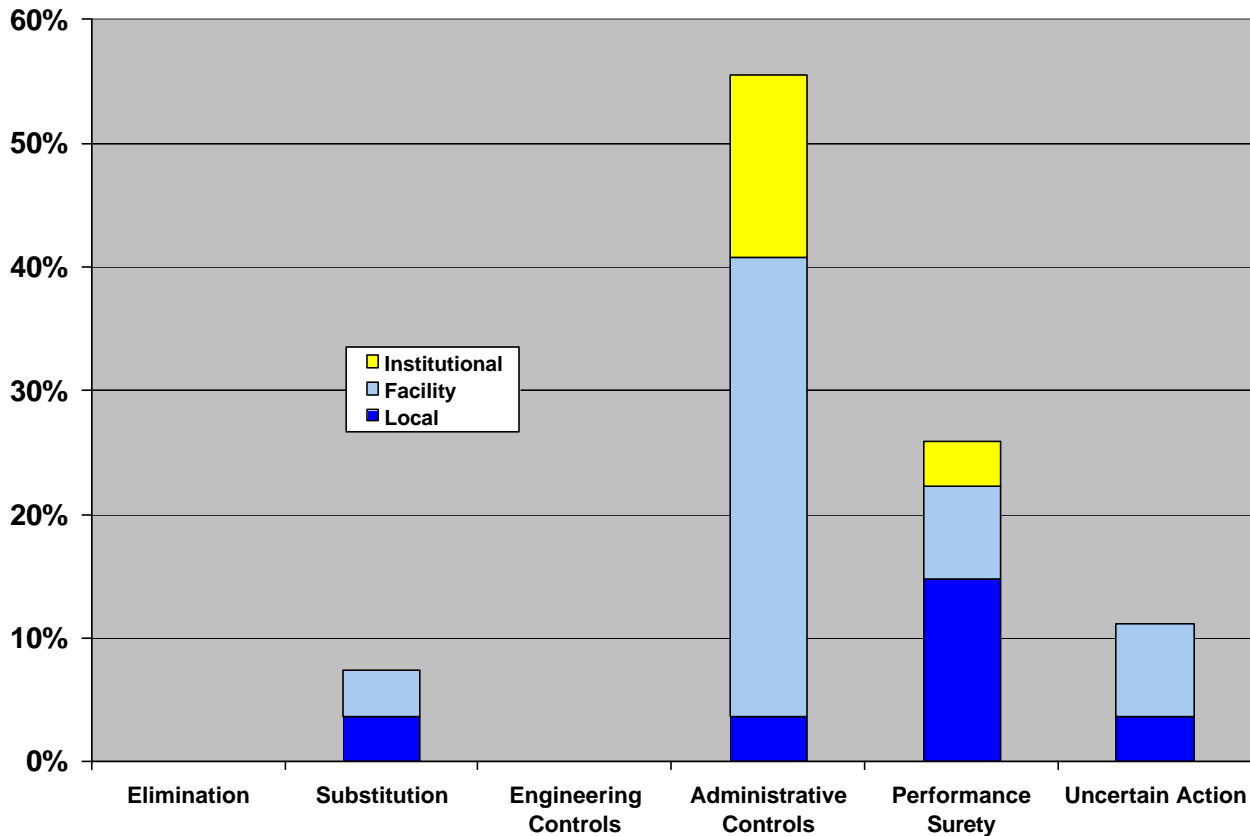
Root Causes of LANSCE Electrical Occurrences



Root Causes Baseline vs. Review

- Procedural/policy-related root causes are principal type for LANSCE electrical safety occurrences—86% of total
- Procedural violations are sole type of personnel-error related root cause

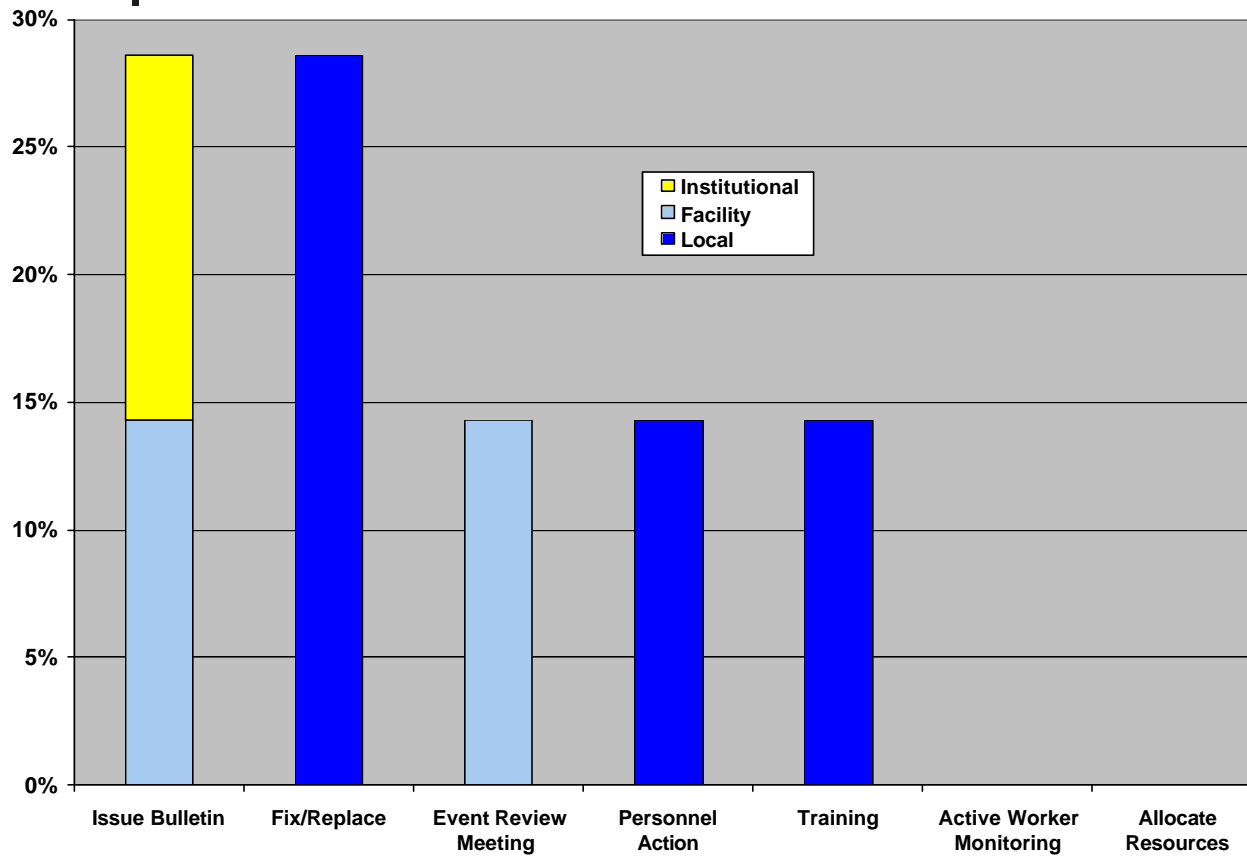
Profile of LANSCE Corrective Actions for Electrical Safety



Corrective Actions (10/98 to 10/02)

- Less than 8% of actions target eliminating or substituting for lesser hazard
- No actions specify new or modified engineering barriers
- 19% of all actions targeted at institutional level
- Nearly 85% of all actions target procedural changes or “performance surety”—driven by root cause pattern of inadequate procedures or policies

LANSCCE Performance Surety Actions for Electrical Safety



Performance Surety Actions (10/01/98 to Present)

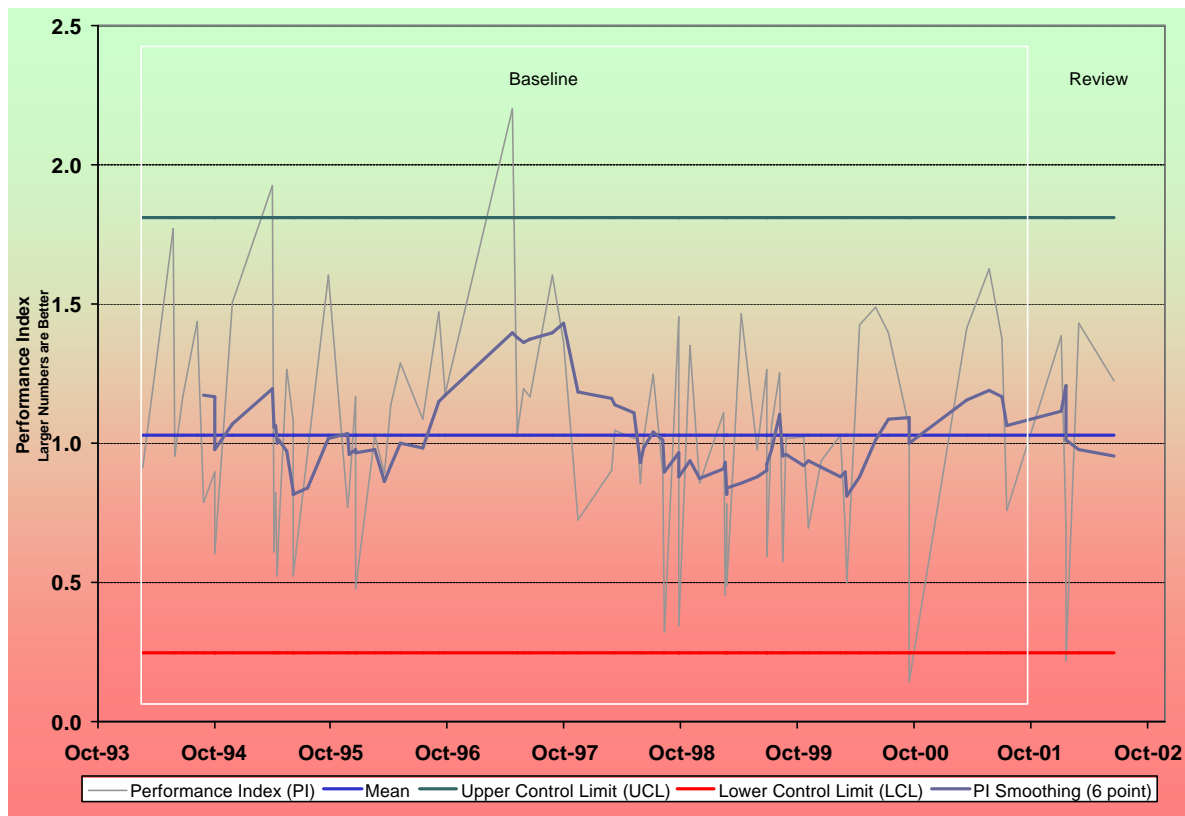
- More than 90% of performance surety actions involve reactive, one-time responses—issuing memos, repairing broken equipment, event meetings, personnel action, etc.
- No actions involve active monitoring of worker performance or new allocation of resources



NIS Division Occurrences

FY2002

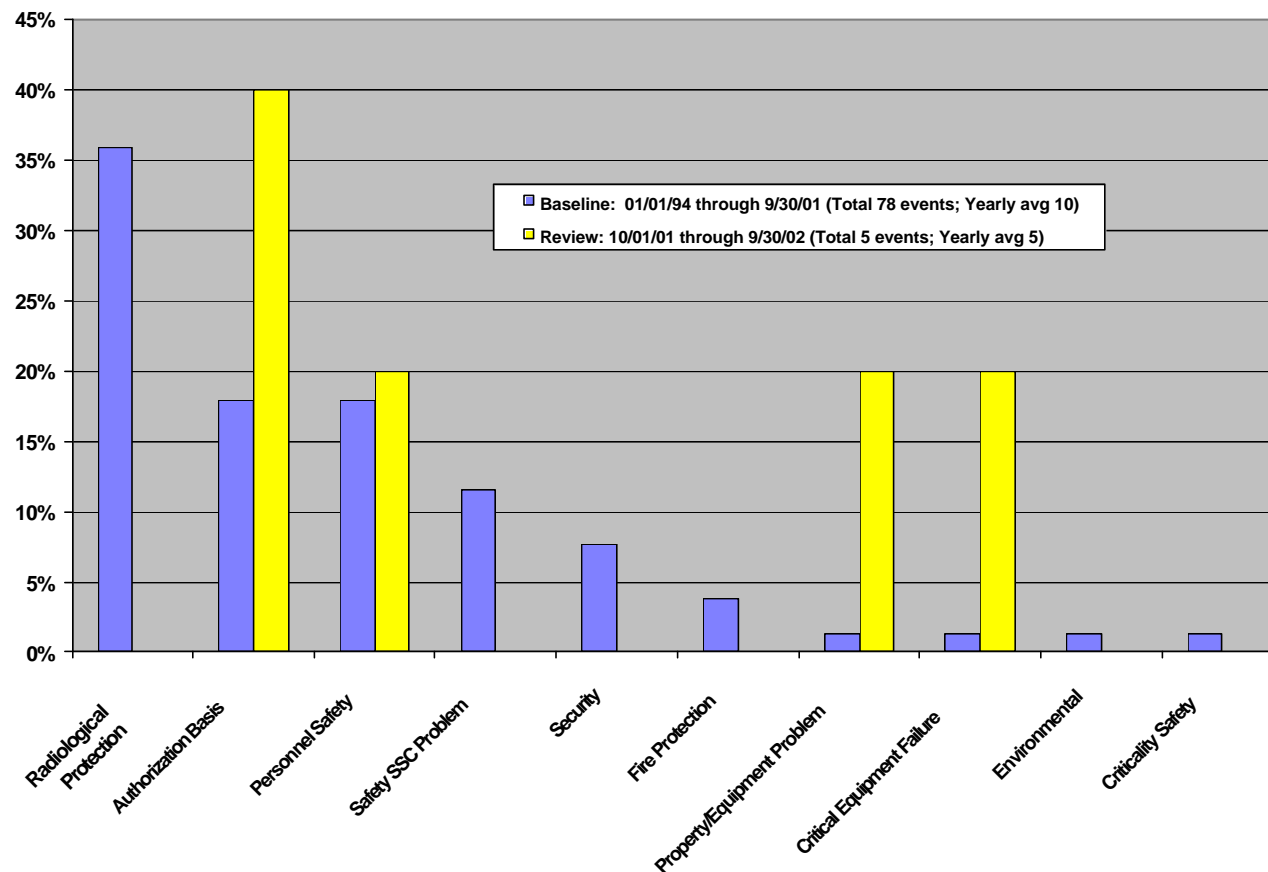
NIS Occurrence Performance



NIS PI Control Chart
(1/94 to 10/02)

- 83 events severity weighted 2, 3, or 4
 - Baseline: 78 events
 - Review: 5 events
- Static performance during baseline and review

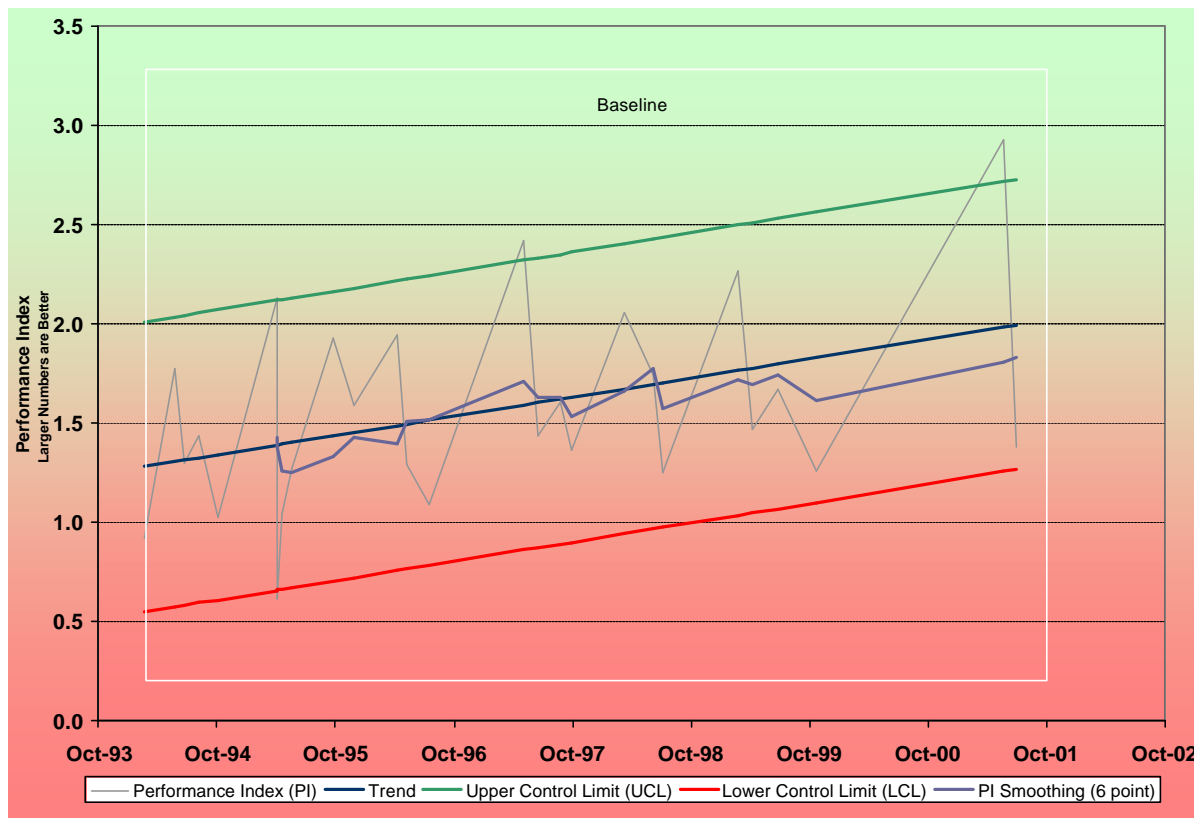
Type Distribution of NIS Occurrences



Occurrences by Type Baseline vs. Review

- Disappearance of historical radiological protection events
- Increase in percentage of authorization basis occurrences from 17% to 40% in review period
- Increase in percentage of Personnel Safety and Property and Critical Equipment Failures

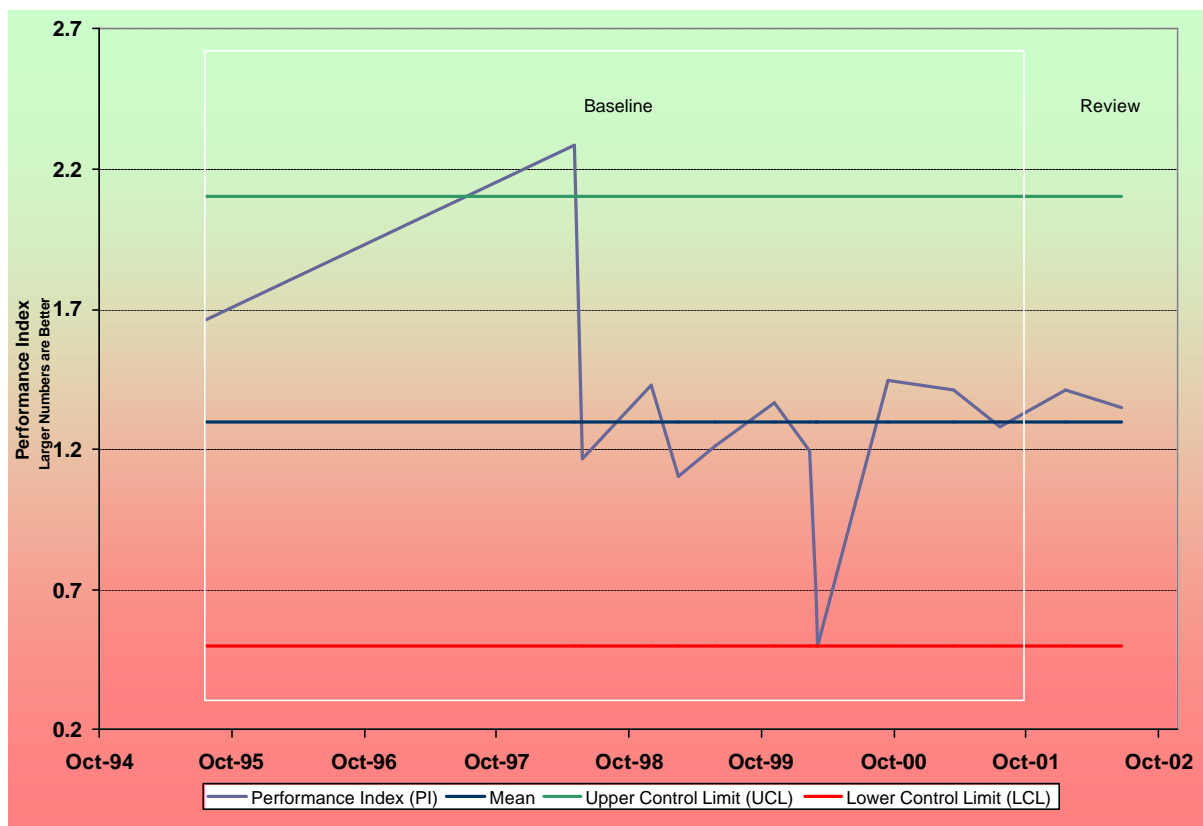
NIS Radiological Protection Occurrence Performance



Radiological Protection Control Chart (1/94 to 10/2)

- 28 events severity weighted 2 or 3
 - Baseline: 28 events
 - Review: 0 events
- Improving performance during baseline period
- Continued improved performance during review period—no further evaluation

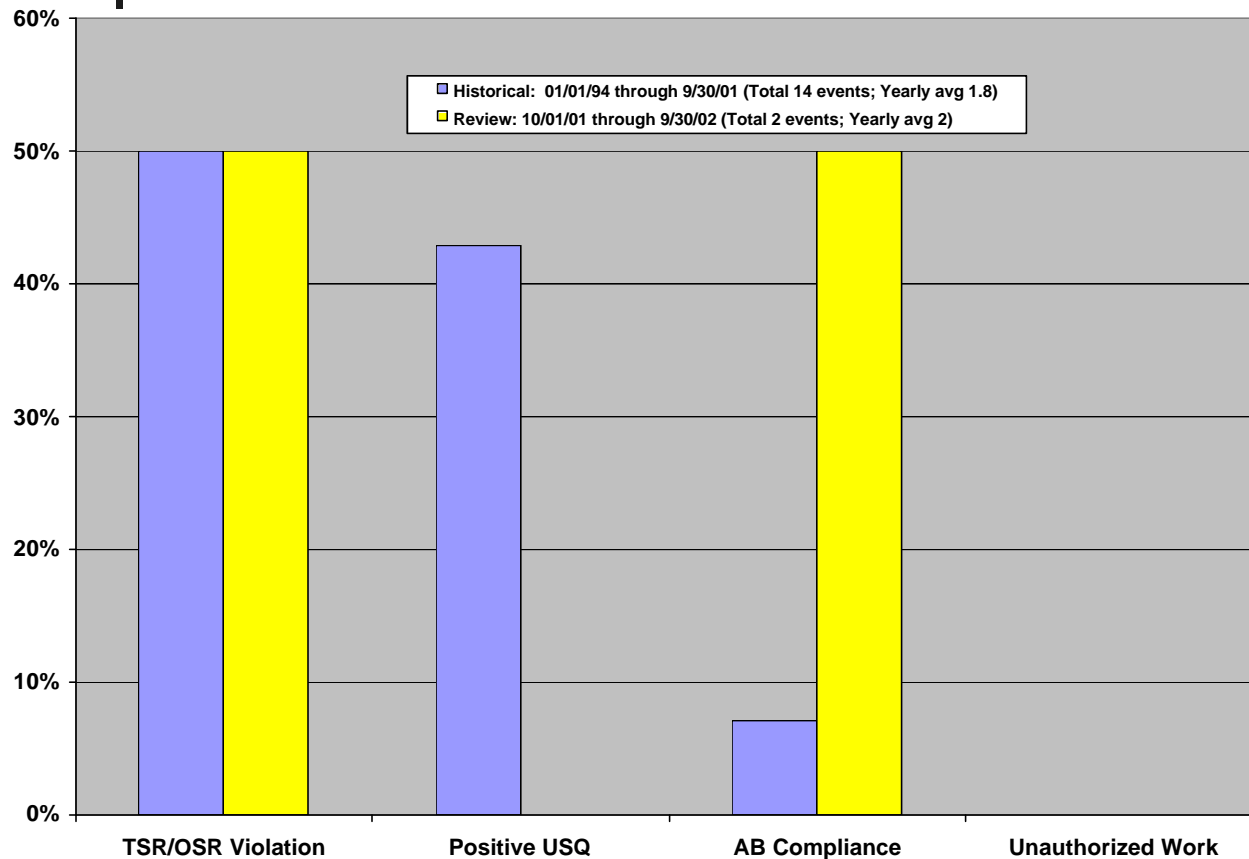
NIS Authorization Basis Occurrence Performance



Authorization Basis Control Chart
(1/94 to 10/2)

- 16 events severity weighted 2 or 3
 - Baseline: 14 events
 - Review: 2 events
- Static performance during baseline and review period

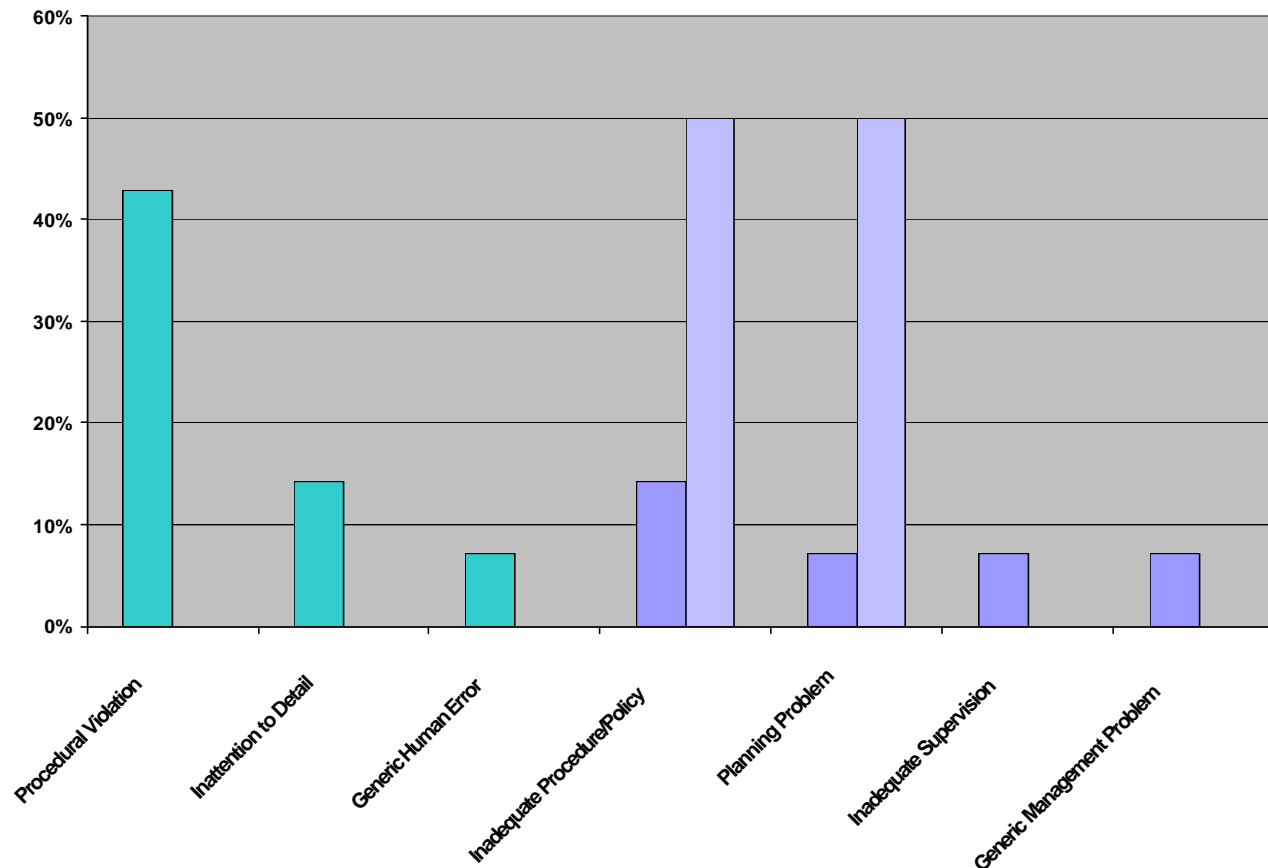
Types of NIS Authorization Basis Occurrences



NIS AB Occurrences by Type Baseline vs. Review

- TSR/OSR violations the predominant type at 50% of both baseline and review periods
- Emergence of AB compliance during review period (1 event)

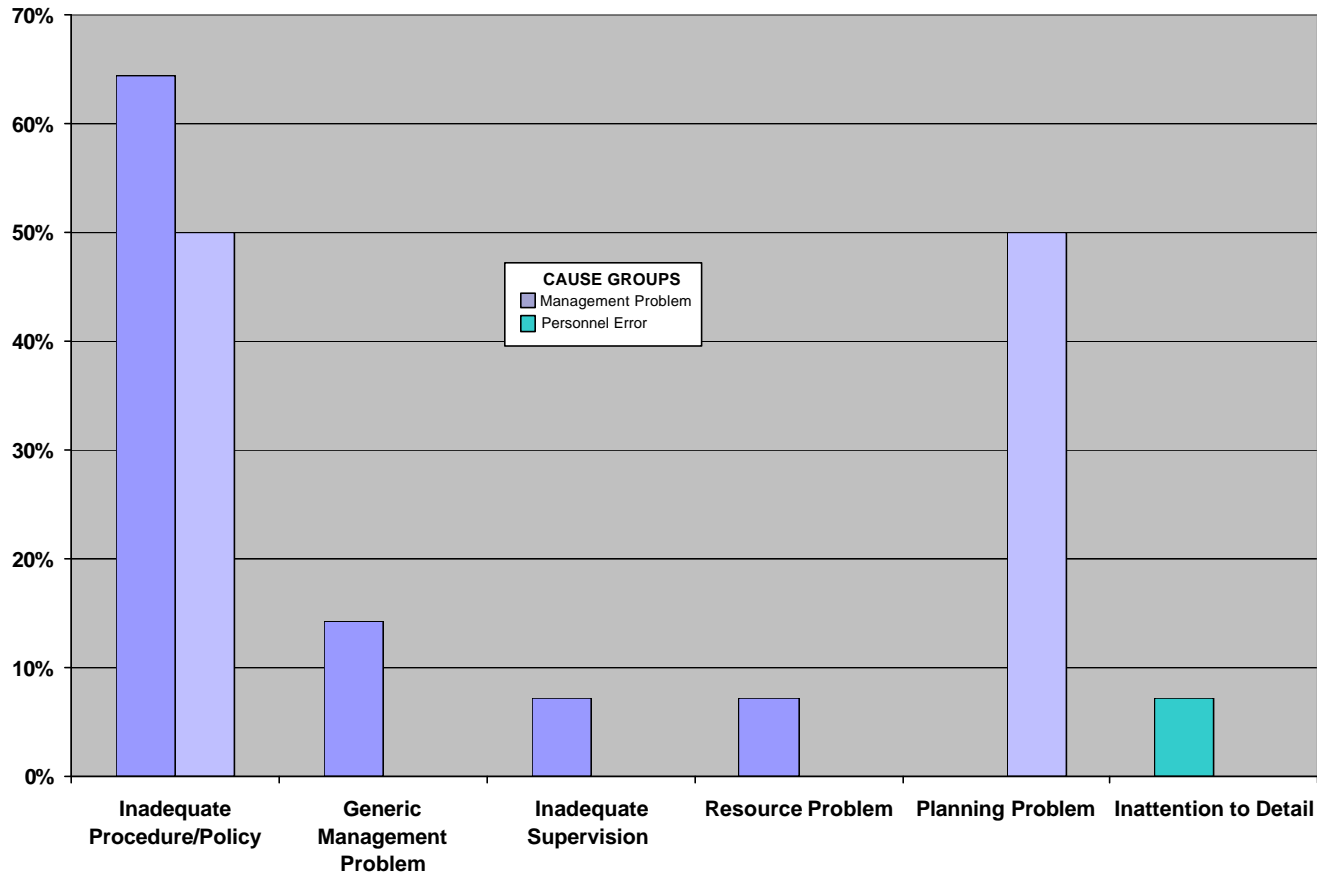
Direct Causes of NIS Authorization Basis Occurrences



Direct Causes Baseline vs. Review

- Decrease in Personnel Error-related direct causes—64% in baseline to 0% in review period (2 events)
- Defective procedures and planning problems sole types of management-related direct causes in review period

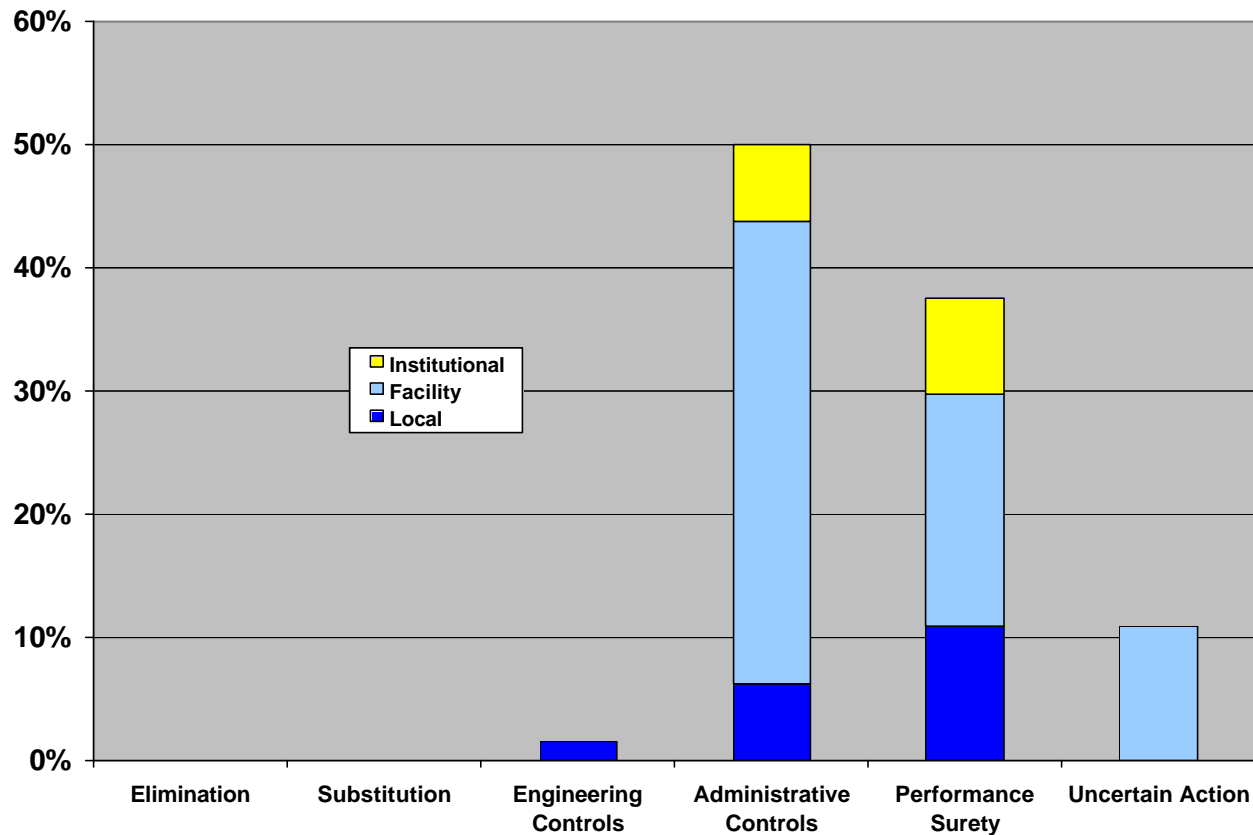
Root Causes of NIS Authorization Basis Occurrences



Root Causes Baseline vs. Review

- Management problems are predominant root cause for baseline and review—93% and 100% respectively
- Disappearance of procedural violations as root cause for review period

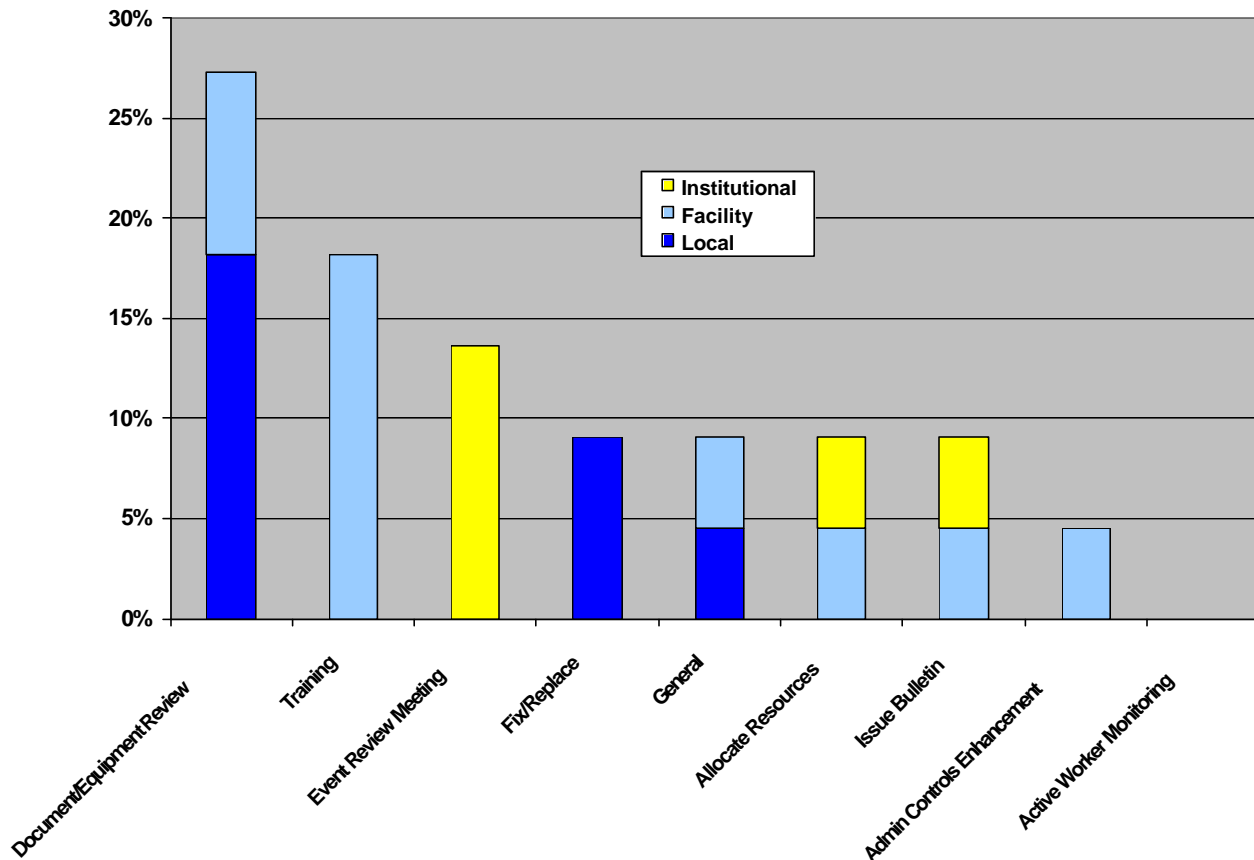
Profile of NIS Corrective Actions for Authorization Basis



Corrective Actions (10/99 to 10/02)

- No actions target eliminating or substituting for lesser hazard
- About 2% of actions specify new or modified engineering barriers
- 14% of all actions targeted at institutional level
- Nearly 90% of all actions target procedural changes or “performance surety”—driven by causal pattern of inadequate procedures/ policies and planning problems

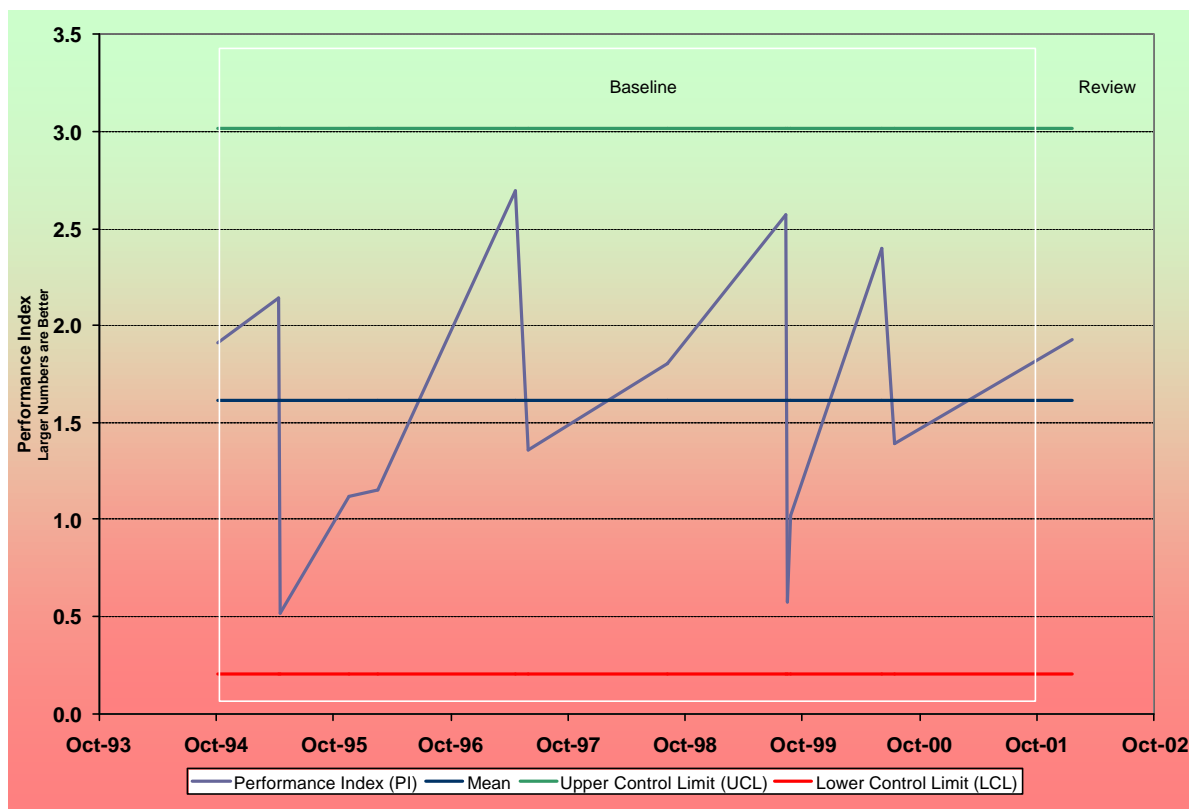
NIS Performance Surety Actions for Authorization Basis



Performance Surety Actions (10/01/99 to Present)

- Many performance surety actions involve reactive, one-time responses—document/equipment reviews, training sessions, equipment repairs, etc.
- No actions involve active monitoring of worker performance

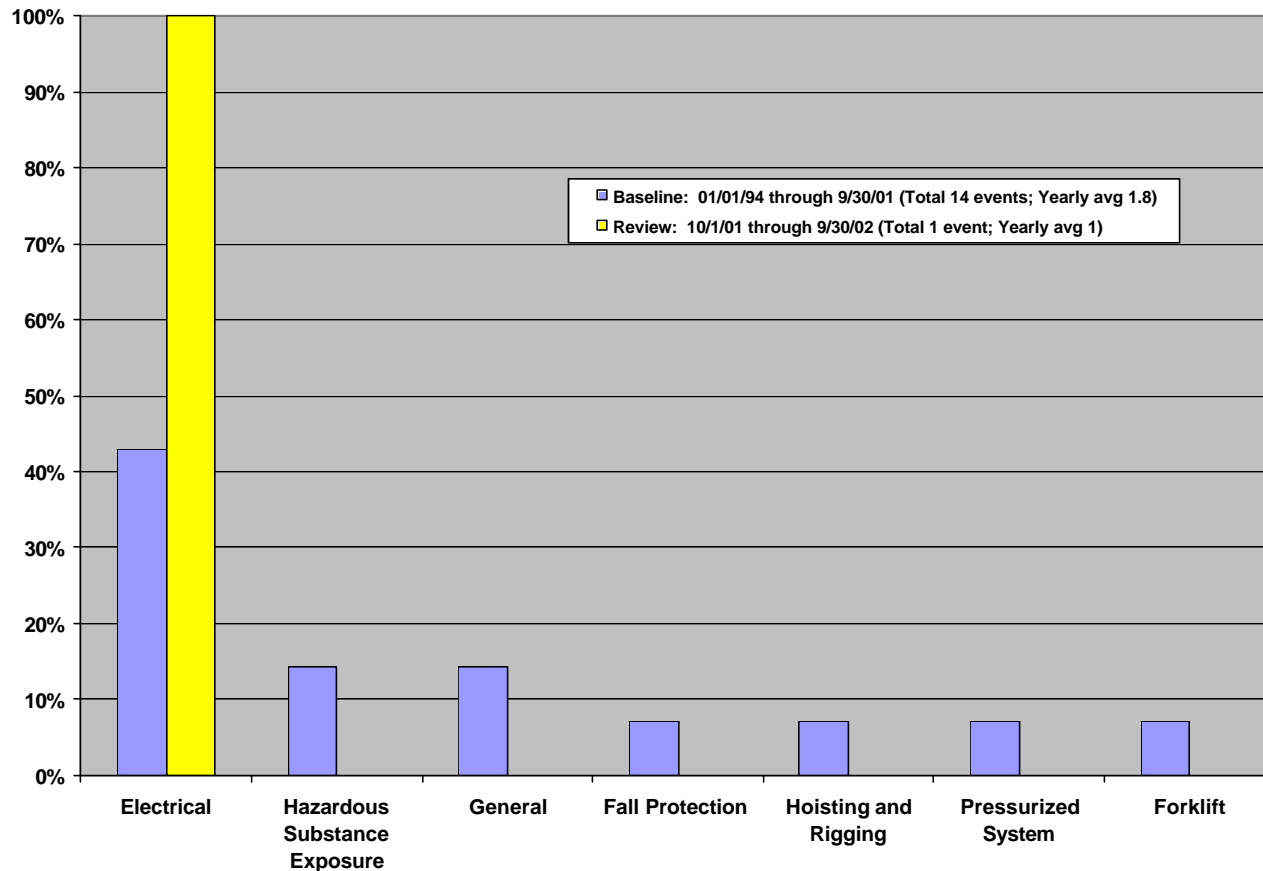
NIS Personnel Safety Occurrence Performance



Personnel Safety Control
Chart
(10/95 to 10/02)

- 15 events severity weighted 2, 3, or 4
 - Baseline: 14 events
 - Review: 1 event
- Static performance during baseline and review

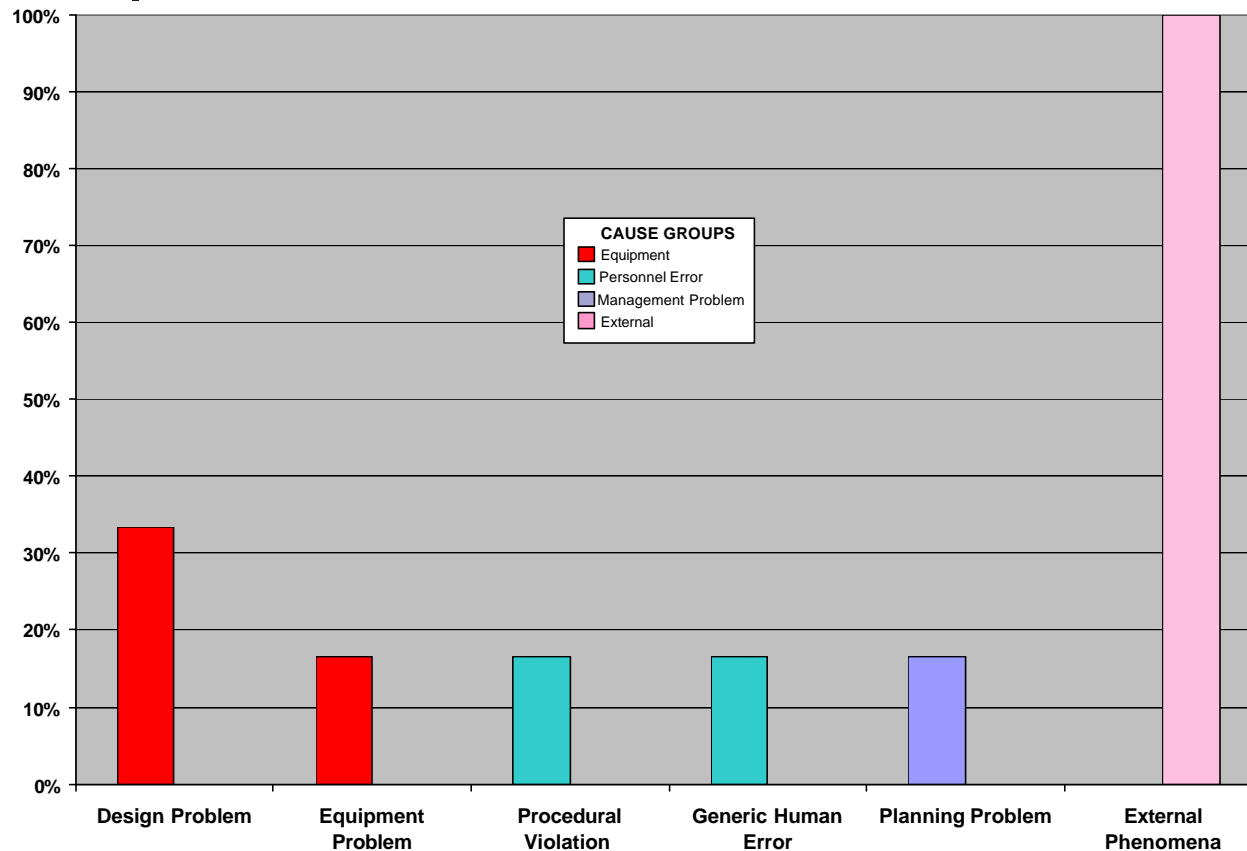
Types of NIS Personnel Safety Occurrences



NIS Personnel Safety Occurrences by Type Baseline vs. Review

- Electrical Safety predominant type of Personnel Safety event for both baseline and review periods—100% of review period (1 event)
- Disappearance of other Personnel Safety types during review period

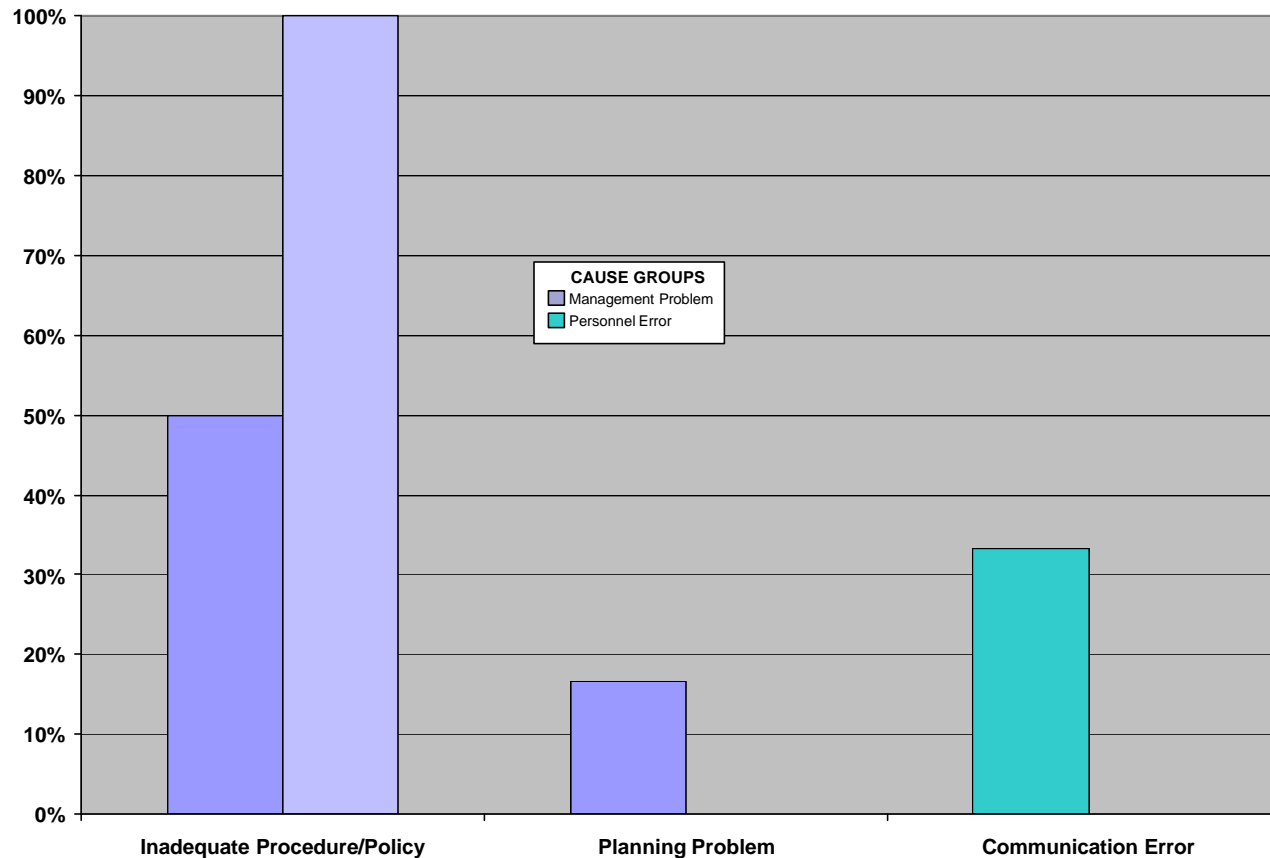
Direct Causes of NIS Electrical Occurrences



Direct Causes Baseline vs. Review

- Equipment Problems and Personnel Error are predominant direct causes for historical baseline period
- External phenomena predominant direct cause for review period (1 event)

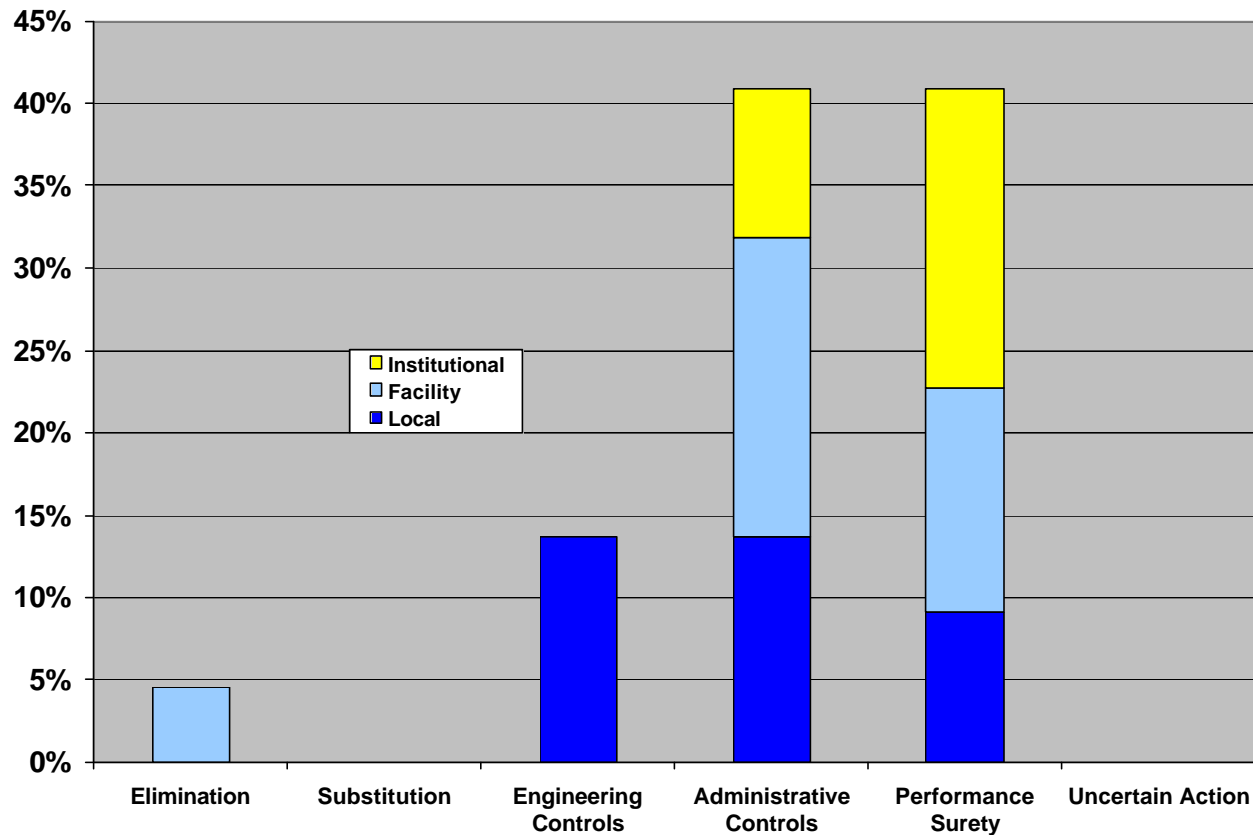
Root Causes of NIS Electrical Occurrences



Root Causes Baseline vs. Review

- Management problems are predominant root cause for baseline and review—67% and 100% respectively
- Disappearance of personnel error as root cause for review period

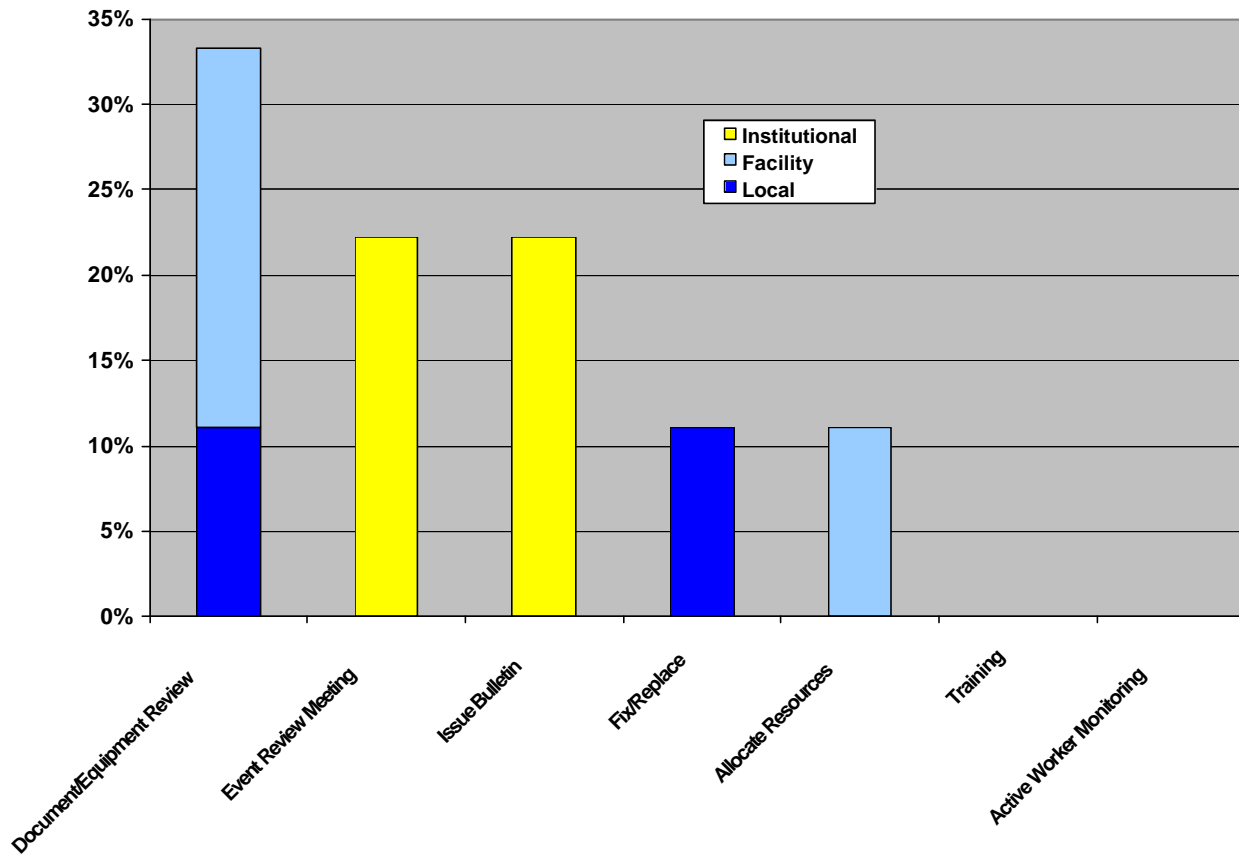
Profile of NIS Corrective Actions for Electrical Safety



Corrective Actions (10/99 to 10/02)

- About 5% of actions target eliminating or substituting for lesser hazard
- About 14% of actions specify new or modified engineering barriers
- More than 80% of all actions target procedural changes or “performance surety”—driven by causal pattern of inadequate procedures/ policies and planning problems

NIS Performance Surety Actions for Electrical Safety



Performance Surety Actions (10/01/99 to Present)

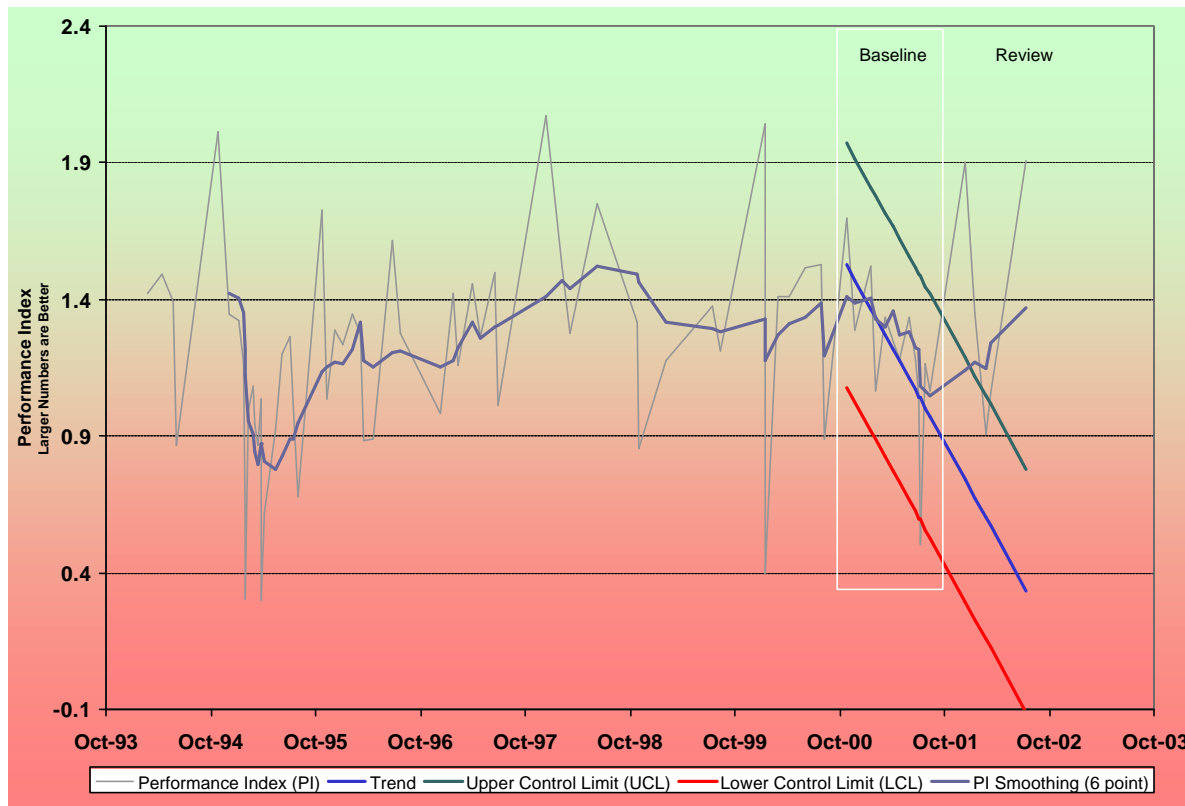
- Many performance surety actions involve reactive, one-time responses—document/equipment reviews, event reviews, equipment repairs, etc.
- No actions involve training or active monitoring of worker performance



DX Division Occurrences

FY2002

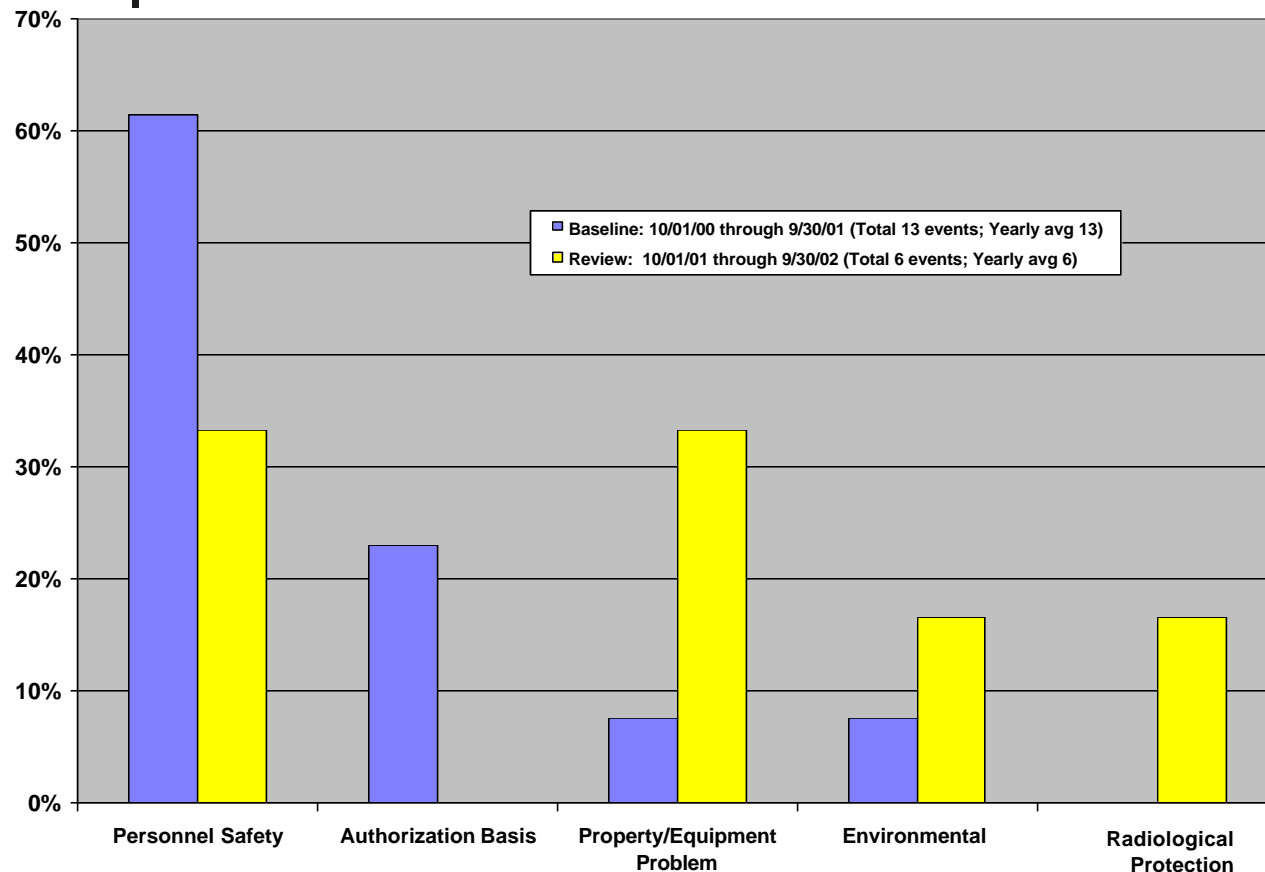
DX Occurrence Performance



DX PI Control Chart
(1/94 to 10/02)

- 75 events severity weighted 2, 3, or 4
 - Pre-Baseline: 56 events
 - Baseline: 13 events
 - Review: 6 events
- Declining performance during baseline
- Marked performance improvement during review period

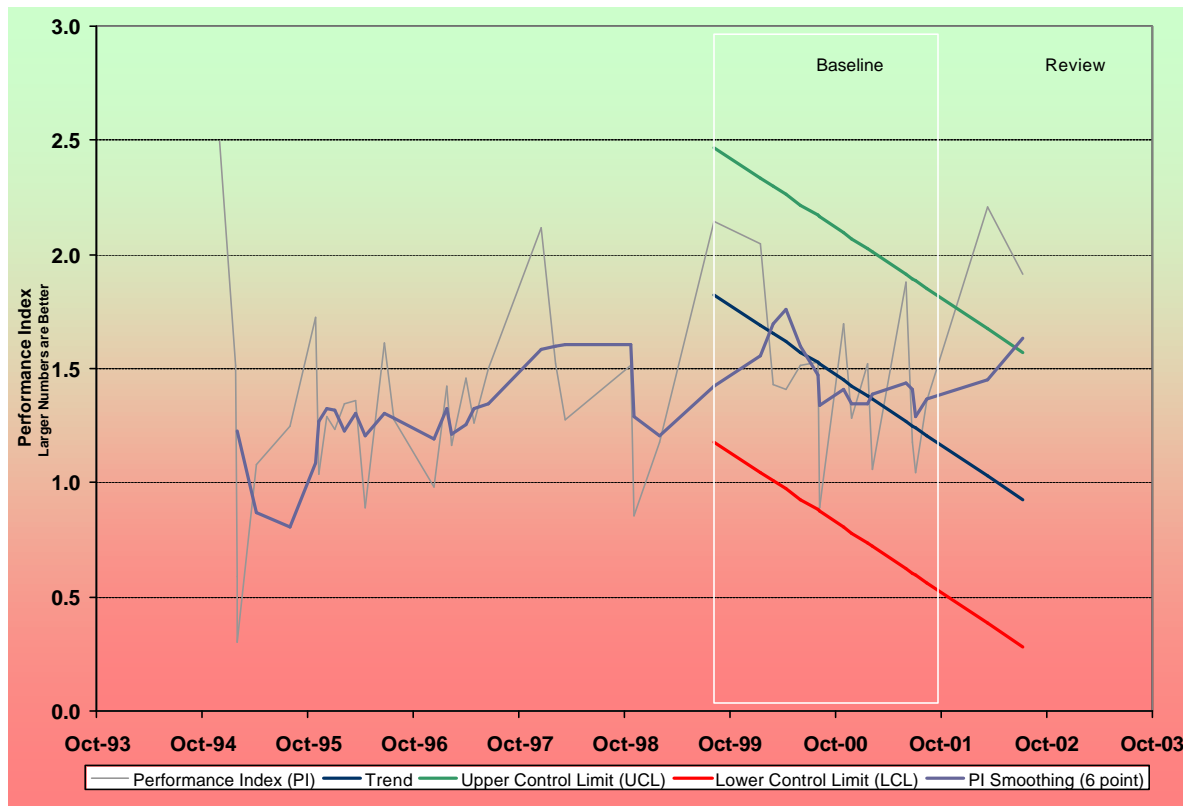
Type Distribution of DX Occurrences



Occurrences by Type Baseline vs. Review

- Predominance of personnel safety events in baseline and review—62% and 33% respectively
- Decrease in percentage of authorization basis occurrences for review period from 22% to 0%
- Increase in percentage of Property Equipment Problems (2 events)

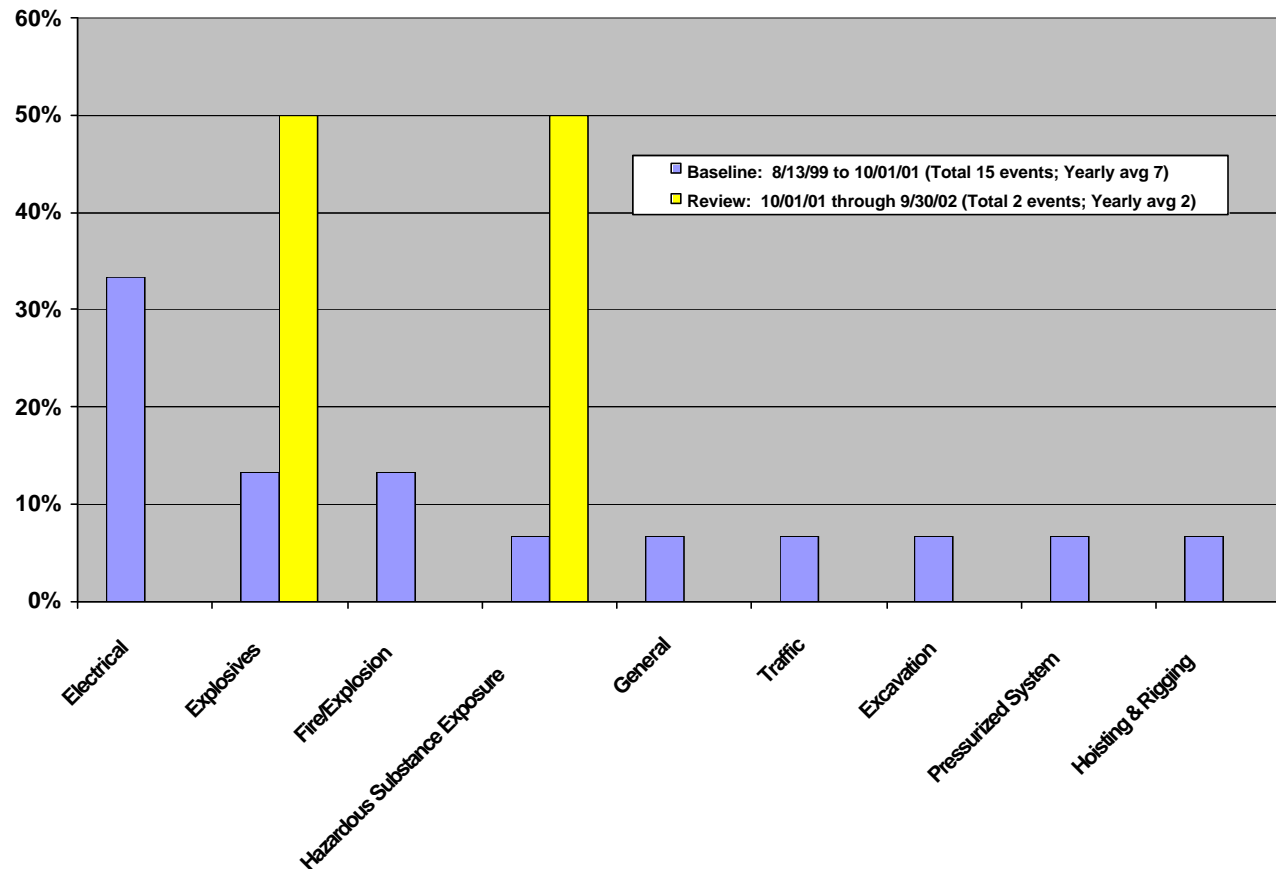
DX Personnel Safety Occurrence Performance



Personnel Safety Control
Chart
(1/94 to 10/2)

- 45 events severity weighted 2, 3, or 4
 - Pre-Baseline: 28 events
 - Baseline: 15 events
 - Review: 2 events
- Declining performance during baseline period
- Improving performance during review period—no further evaluation

Types of DX Personnel Safety Occurrences



DX Personnel Safety Occurrences by Type Baseline vs. Review

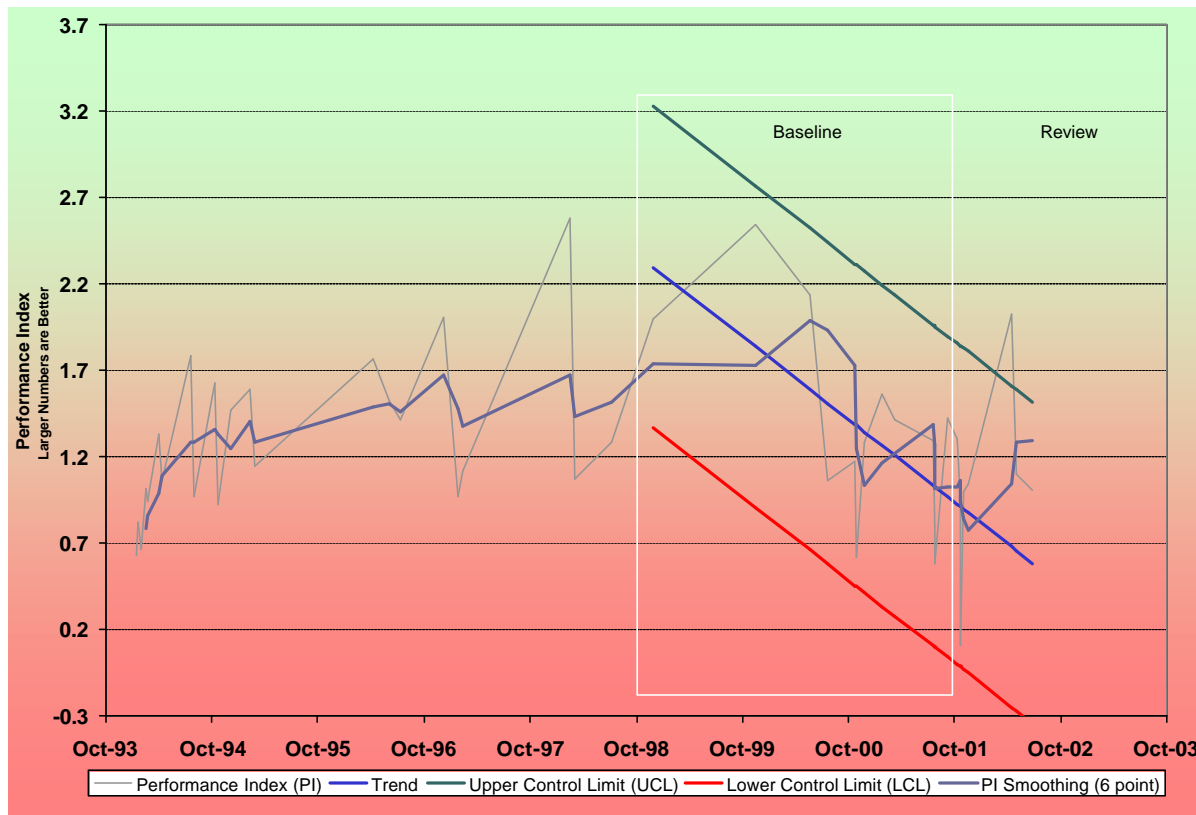
- Disappearance of predominant Electrical Safety type during review period
- Explosives and Hazardous Substance Exposure events during review period (1 event each)



MST Division Occurrences

FY2002

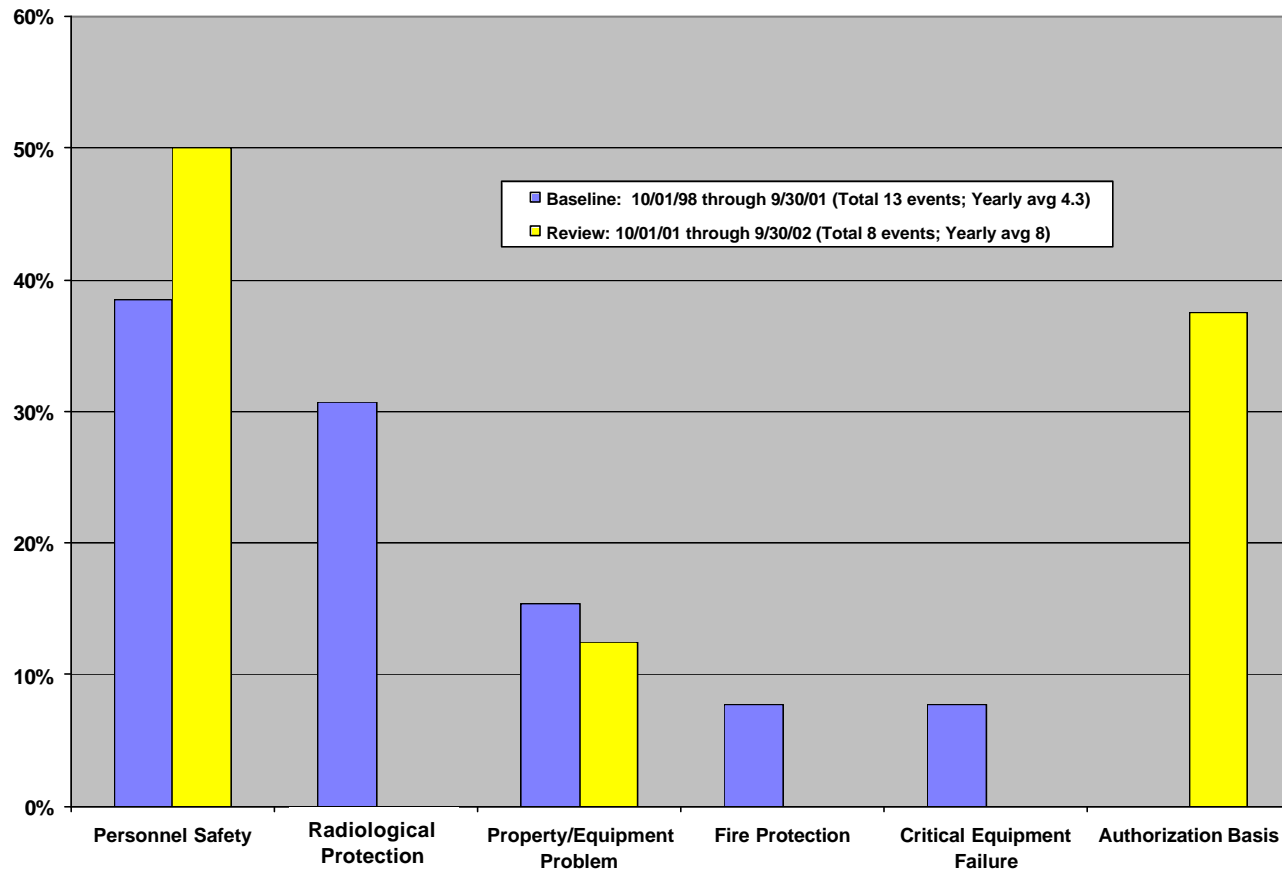
MST Occurrence Performance



MST PI Control Chart
(1/94 to 10/02)

- 45 events severity weighted 2 or 3
 - Historical: 24 events
 - Baseline: 13 events
 - Review: 8 events
- Declining performance during baseline
- Static performance during review period

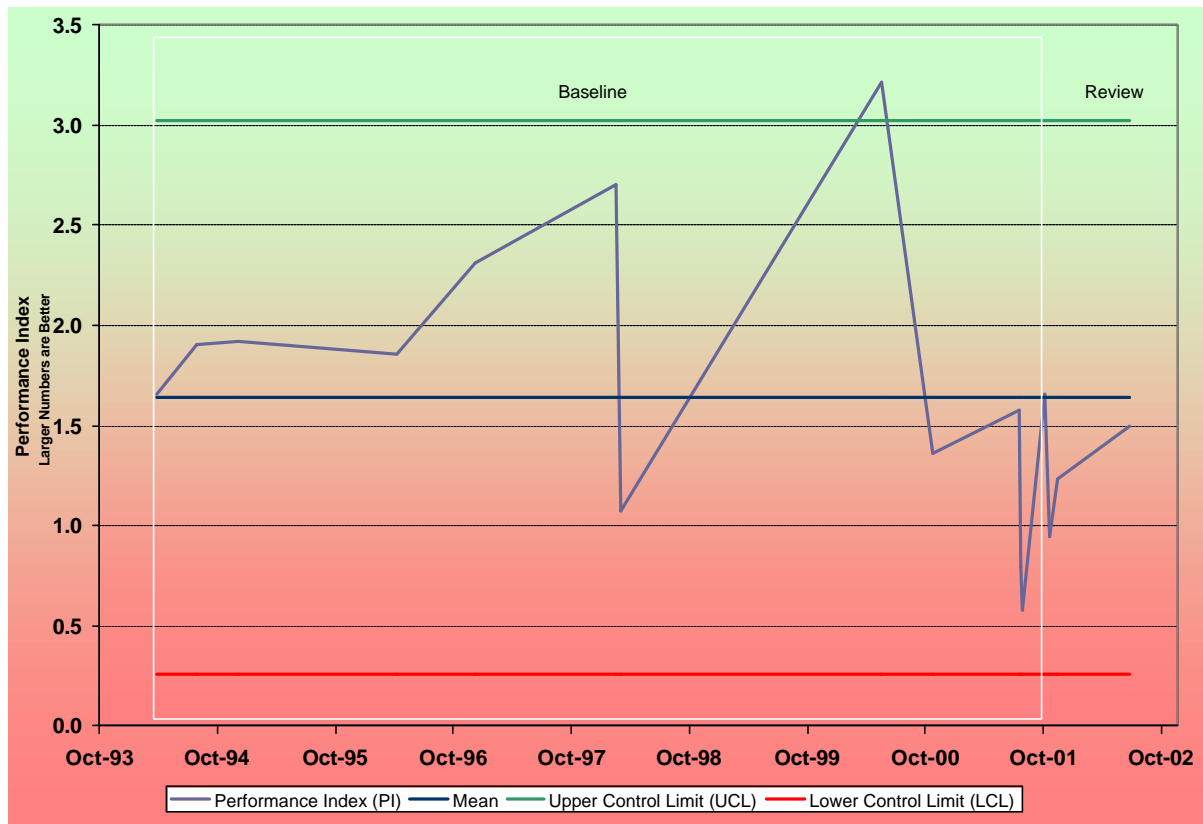
Type Distribution of MST Occurrences



Occurrences by Type Baseline vs. Review

- Predominance of Personnel Safety events in baseline and review—38% and 50% respectively
- Decrease of other types of events—Radiological Protection, Property/Equipment, Fire Protection, Critical Equipment
- Emergence of Authorization Basis events in review period

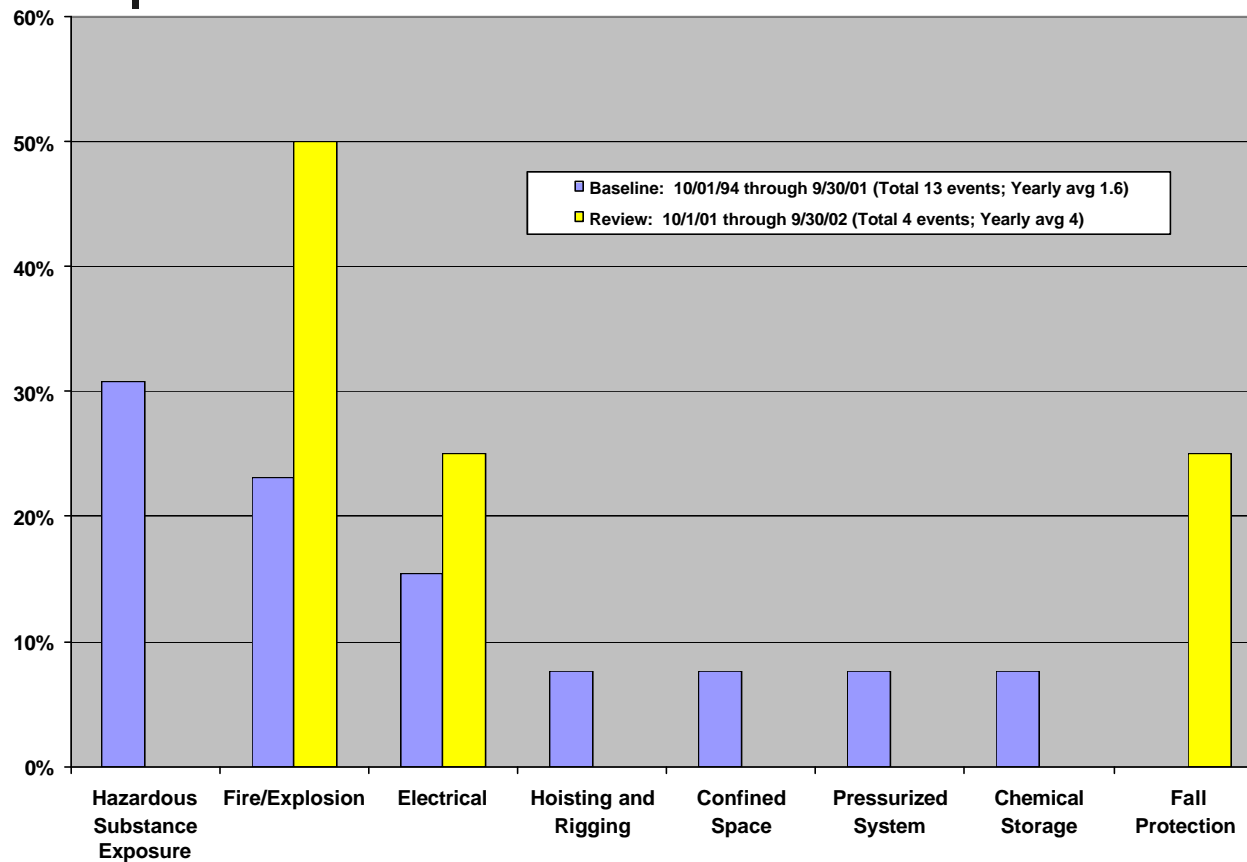
MST Personnel Safety Occurrence Performance



Personnel Safety Control Chart
(1/94 to 10/2)

- 17 events severity weighted 2 or 3
 - Baseline: 13 events
 - Review: 4 events
- Static performance during baseline and review periods

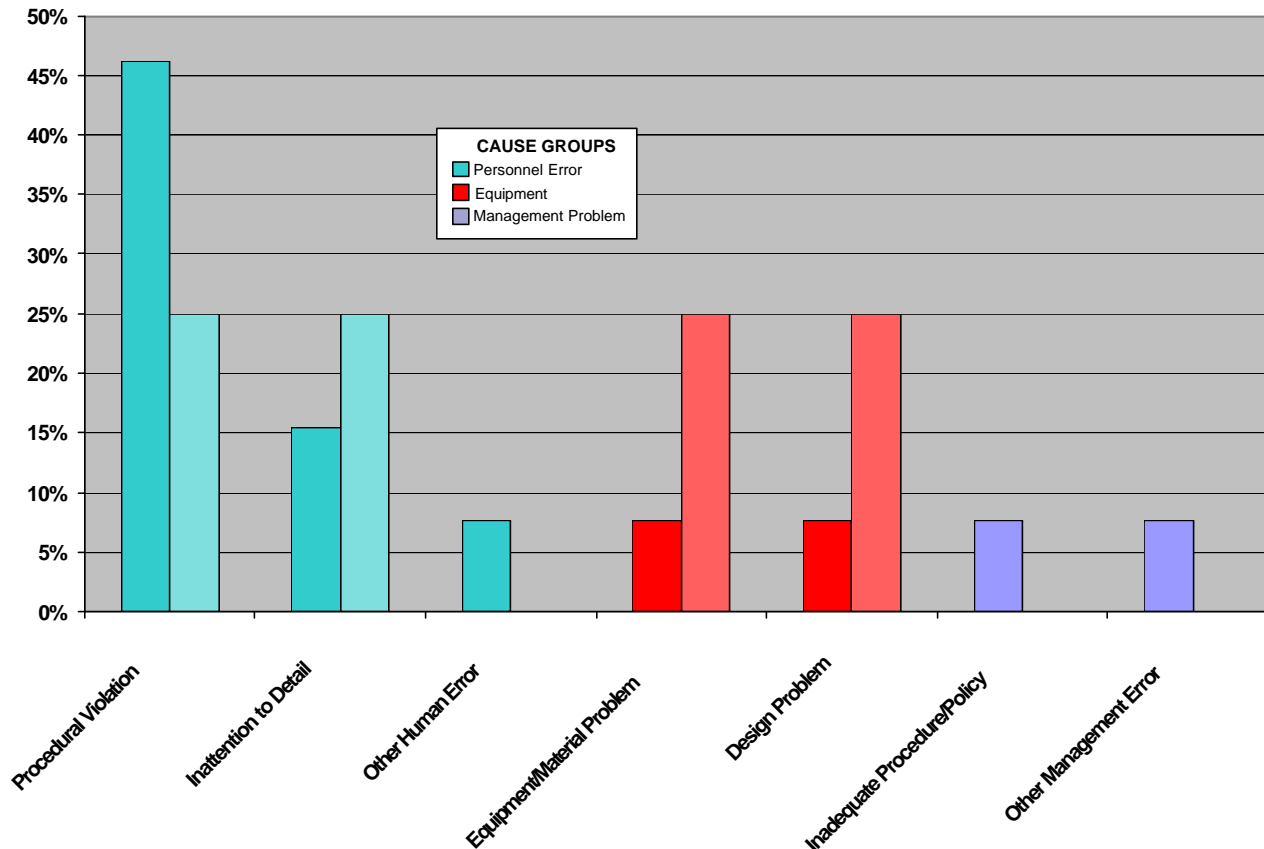
Types of MST Personnel Safety Occurrences



MST Personnel Safety Occurrences by Type Baseline vs. Review

- Disappearance of predominant historical type Hazardous Substance Exposure during review period
- Increase of Fire/Explosion, Electrical, and Fall Protection types for review period

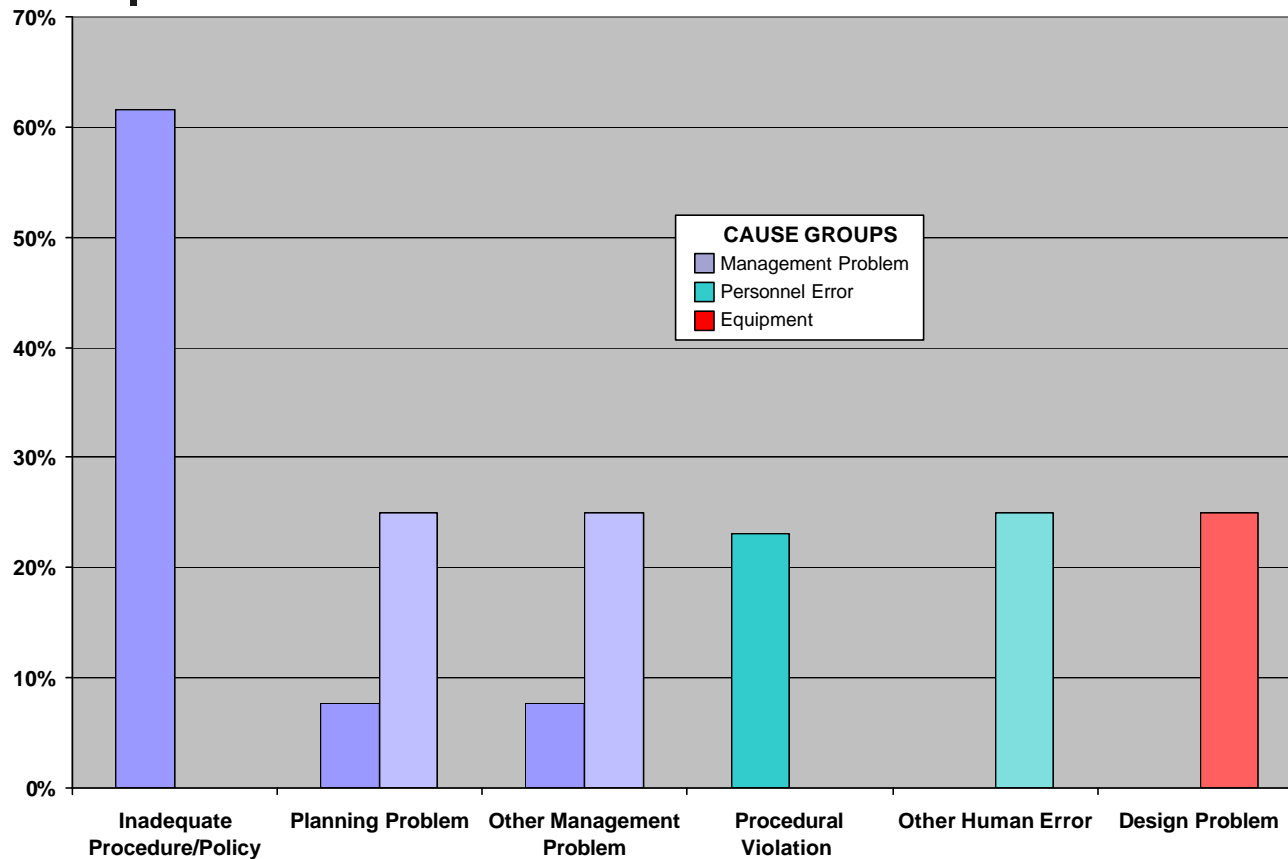
Direct Causes of MST Personnel Safety Occurrences



Direct Causes Baseline vs. Review

- Personnel Error principal direct cause for baseline and review periods—about 70% and 50% respectively
- Increase in Equipment-related direct causes—from 16% to 50%
- Disappearance of Management-related direct causes for review period

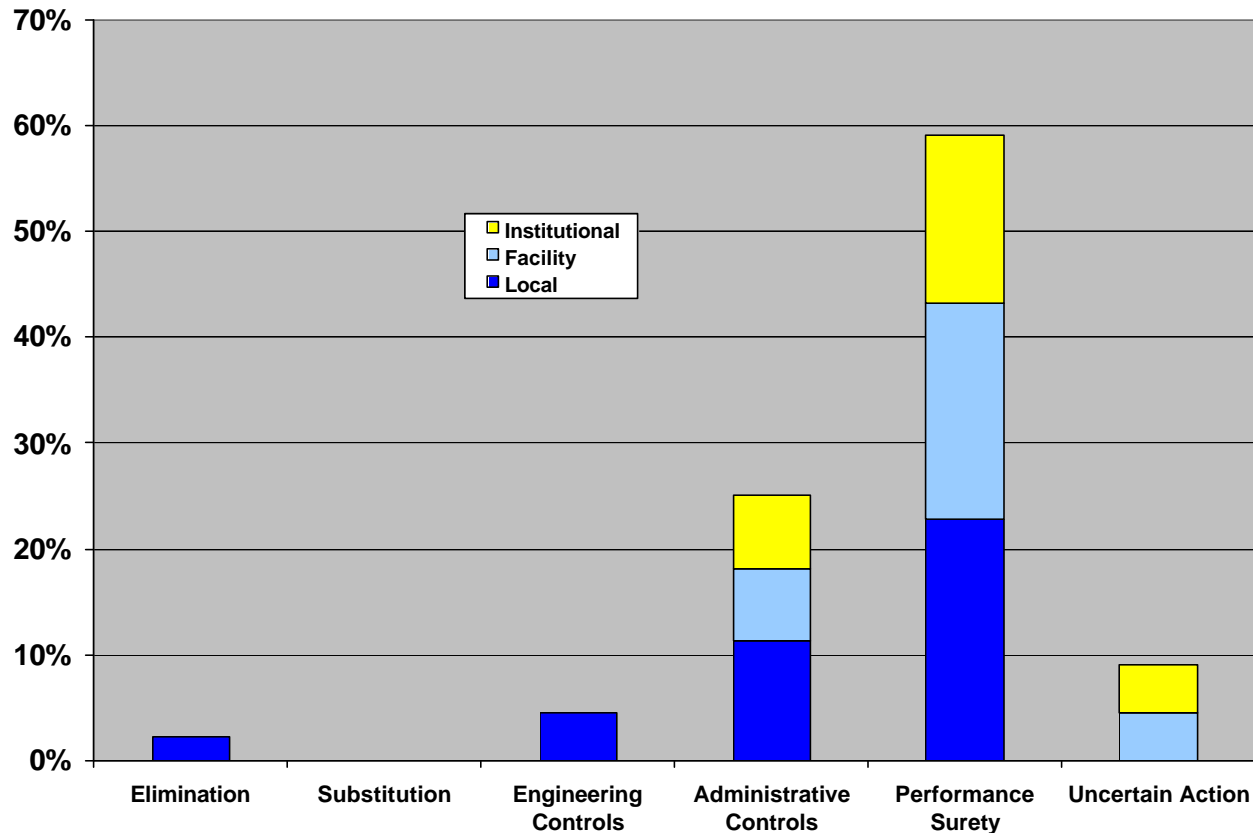
Root Causes of MST Personnel Safety Occurrences



Root Causes Baseline vs. Review

- Management Problems are principal root causes in baseline and review period—78% and 50% respectively
- Personnel Error root cause static performance—23% and 25% respectively
- Emergence of Equipment Problem root cause in review period

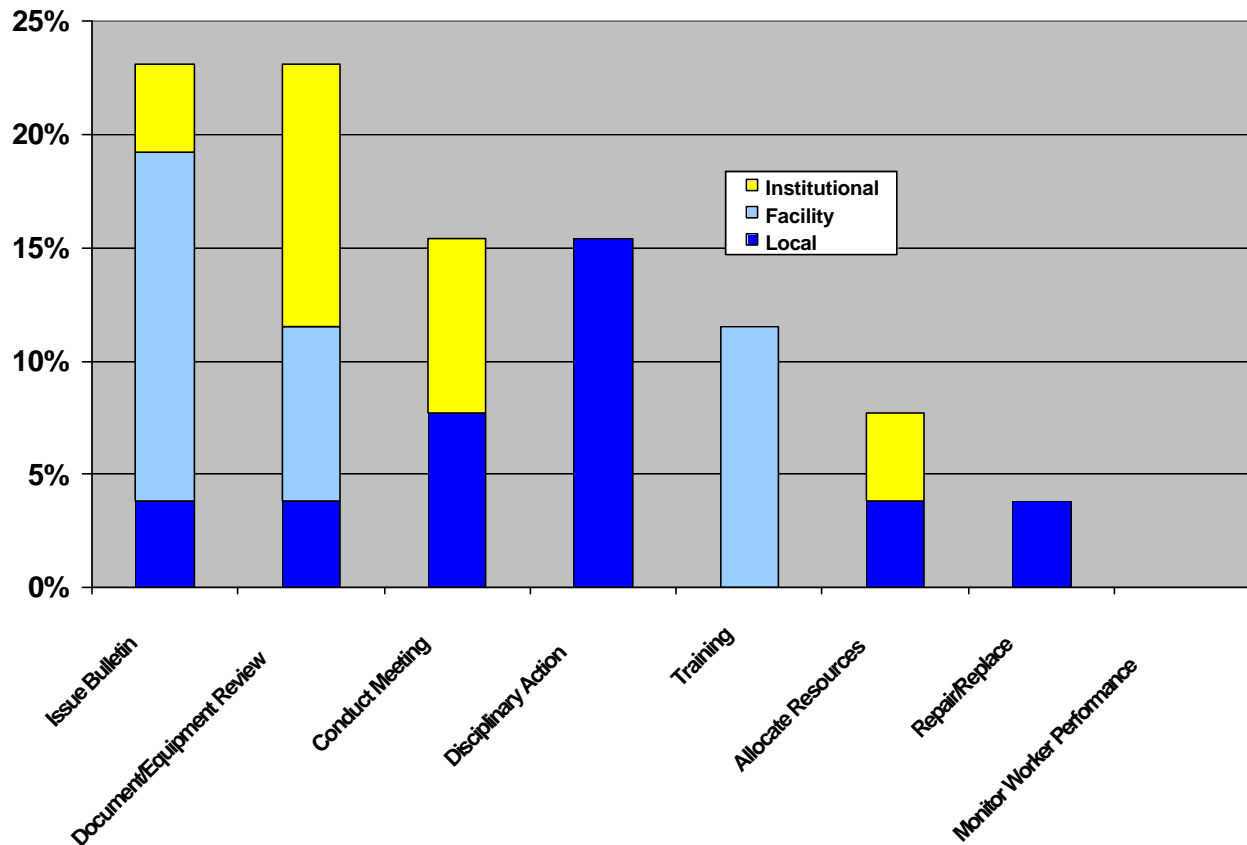
Profile of MST Corrective Actions for Personnel Safety Events



Corrective Actions (10/01/99 to 10/02)

- 2% of actions target eliminating or substituting for lesser hazard
- About 5% specify new or modified engineering barriers
- About 85% of all actions target procedural changes or "performance surety"—driven by causal patterns of personnel errors and inadequate procedures

MST Performance Surety Actions for Personnel Safety Events



Performance Surety Actions (10/01/99 to Present)

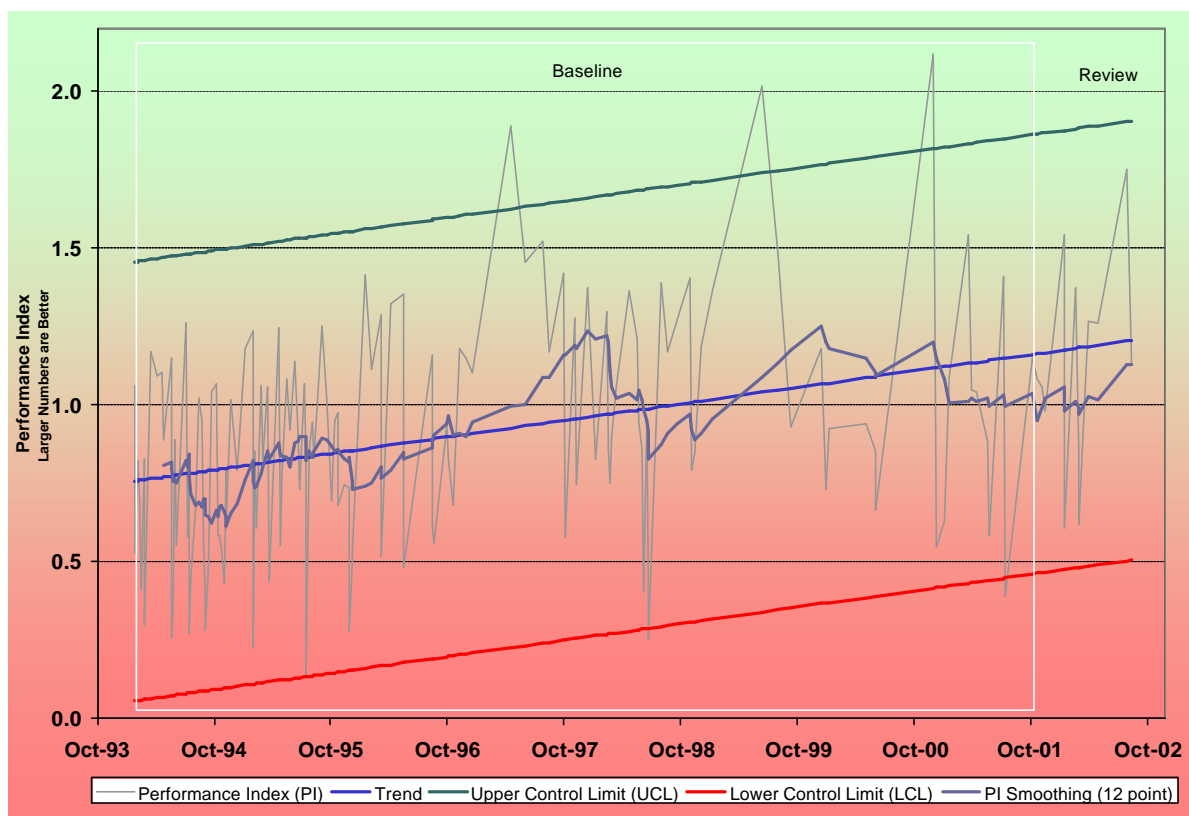
- Actions primarily involve reactive, one-time responses—conducting document/equipment reviews, issuing bulletins, event meetings, and disciplinary actions
- 28% of actions targeted at institutional level
- Absence of active monitoring of worker performance



Small Division Occurrences

FY2002

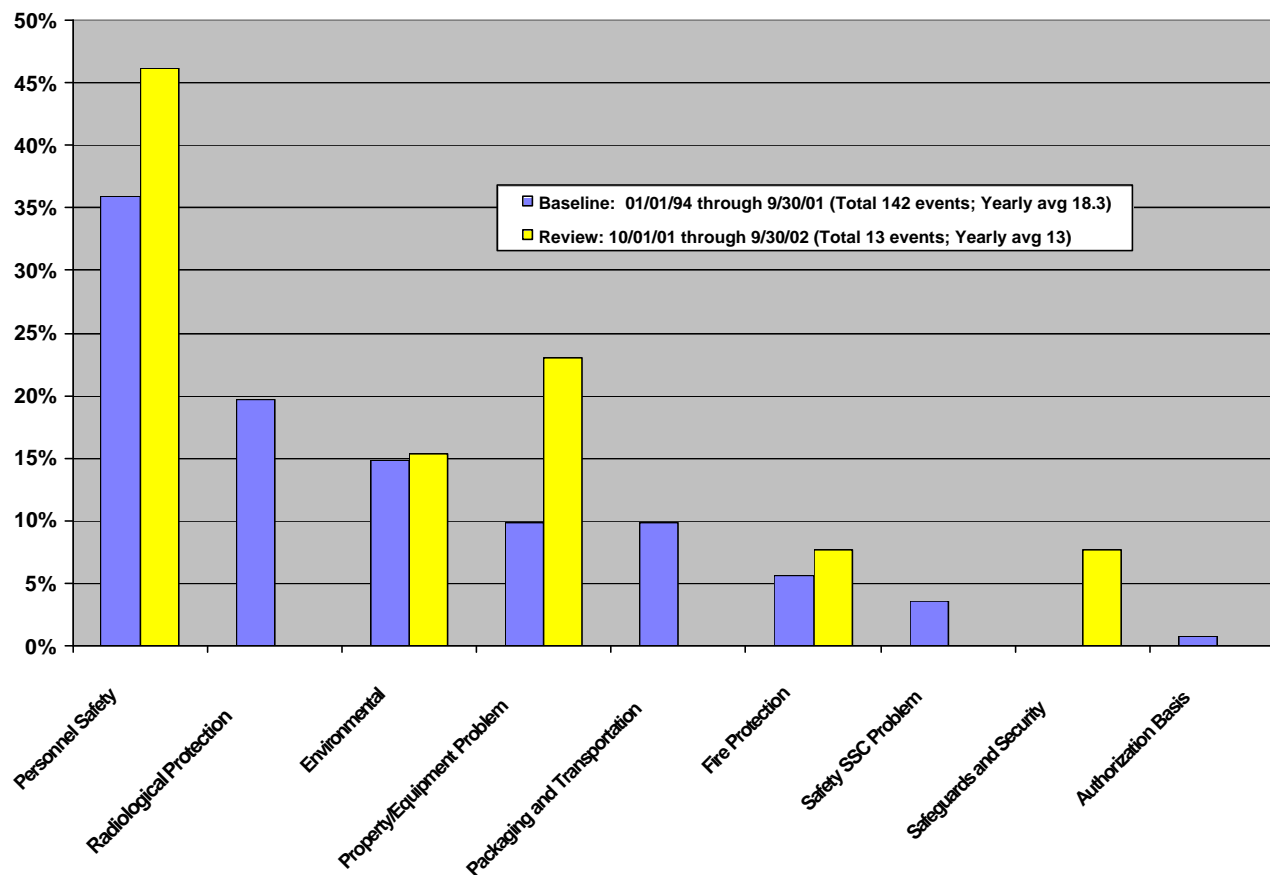
LANL Small Division Occurrence Performance



Small Division PI Control Chart
(1/94 to 10/02)

- 155 events severity weighted 2, 3, or 4
 - Baseline: 142 events
 - Review: 13 events
- Improving performance during baseline
- Improving performance during review period

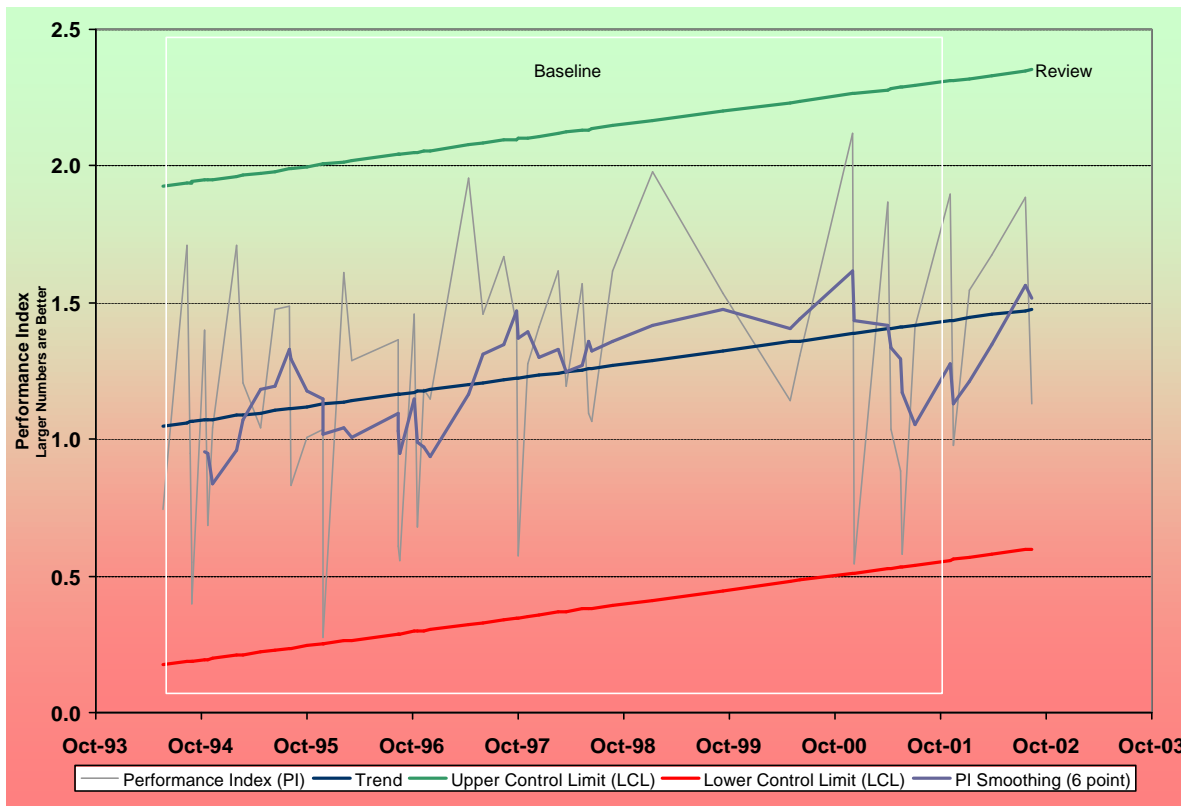
Type Distribution of Small Division Occurrences



Occurrences by Type Baseline vs. Review

- Predominance of personnel safety events in baseline and review—36% and 46% respectively
- Disappearance of Radiological Protection and other types of Personnel Safety events
- Increase in percentage of Property/Equipment problems

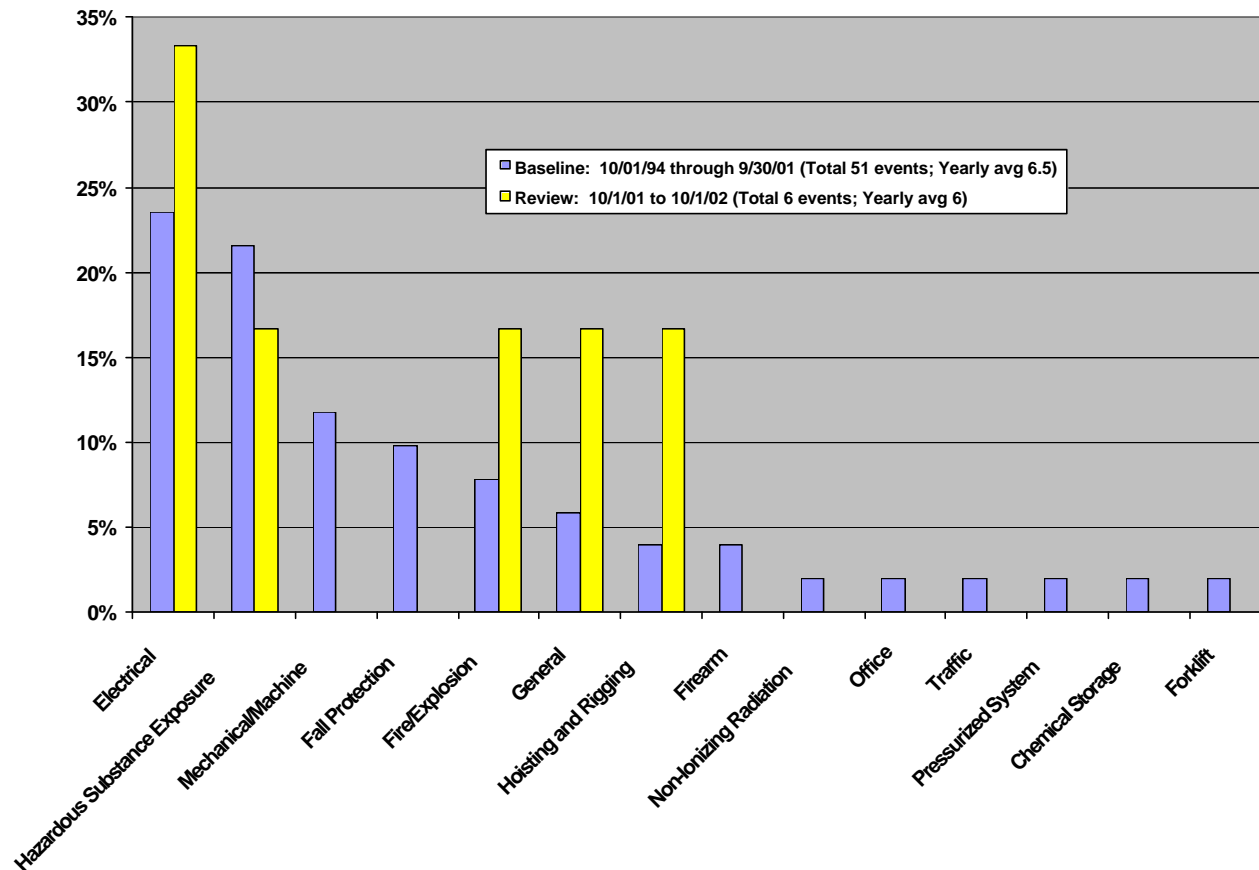
Small Division Personnel Safety Occurrence Performance



Personnel Safety Control Chart
(1/94 to 10/2)

- 57 events severity weighted 2, 3 or 4
 - Baseline: 51 events
 - Review: 6 events
- Improving performance during baseline and review periods—no further evaluation

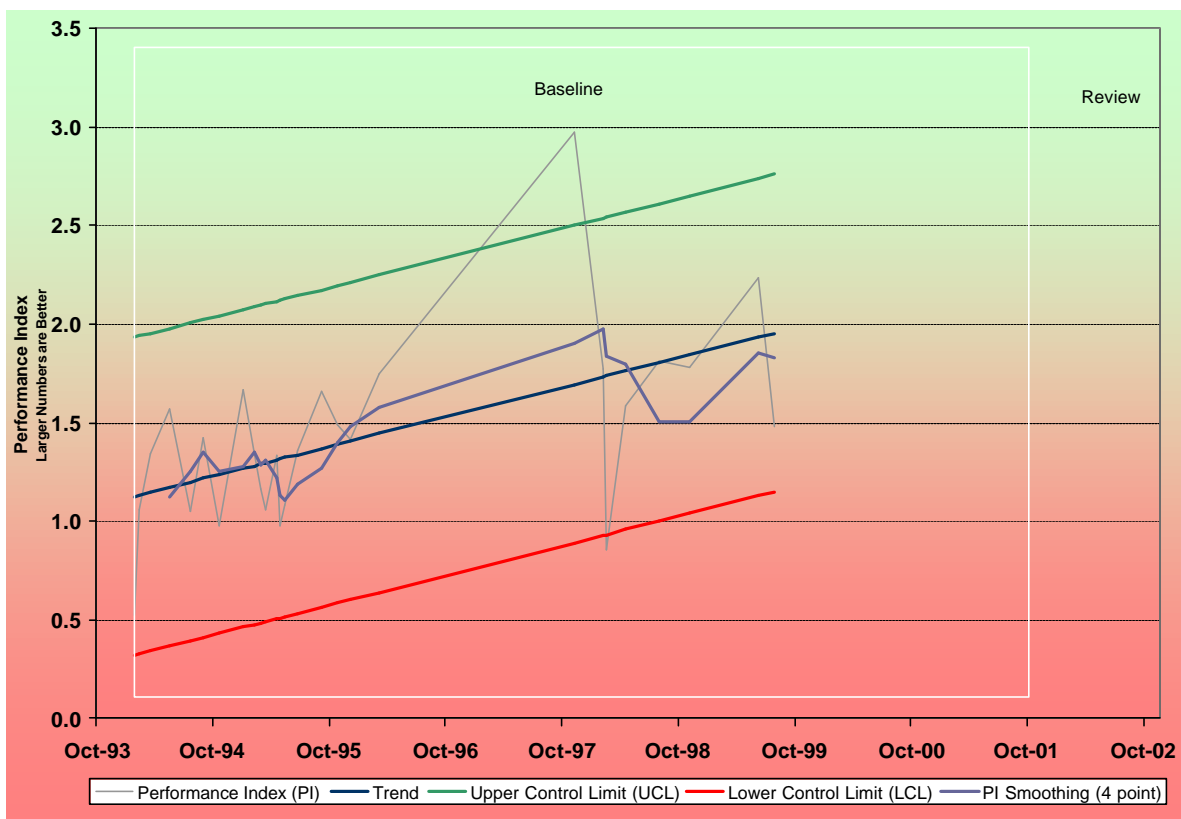
Types of Small Division Personnel Safety Occurrences



Small Division Personnel Safety Occurrences by Type Baseline vs. Review

- Electrical Safety predominant in both baseline and review periods—24% and 33% respectively
- Increase of Fire/Explosion, General, and Hoisting and Rigging types for review period

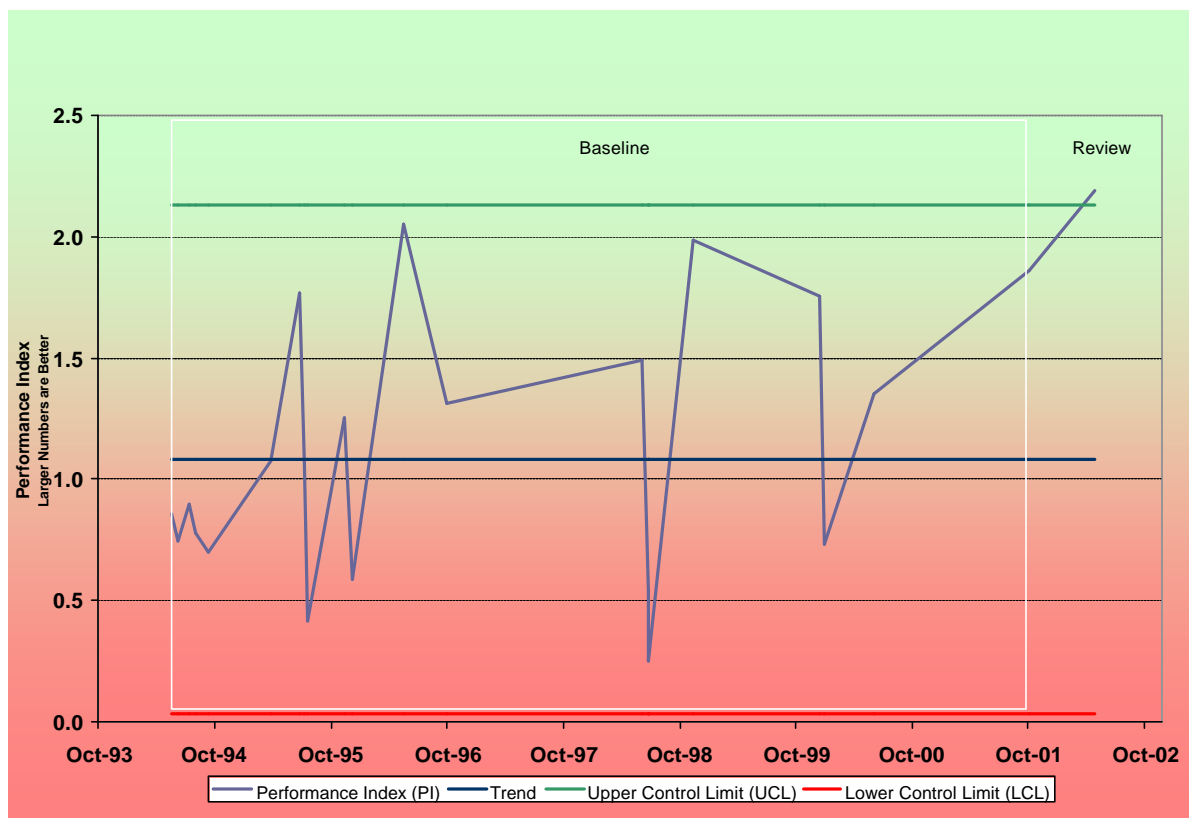
Small Division Radiological Protection Occurrence Performance



Radiological Protection Control Chart (1/94 to 10/2)

- 28 events severity weighted 2 or 3
 - Baseline: 28 events
 - Review: 0 events
- Improving performance during baseline period
- No radiological protection occurrences during review period—no further evaluation

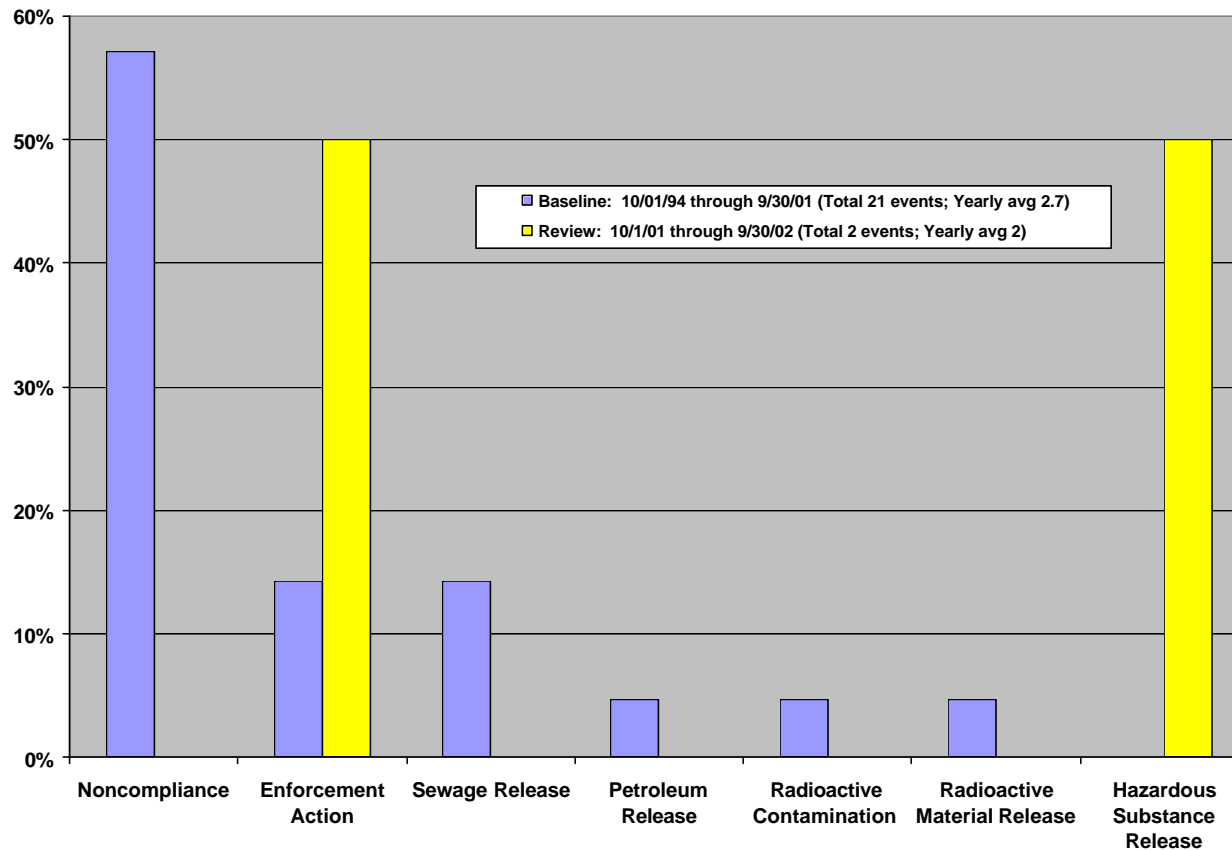
Small Division Environmental Occurrence Performance



Environmental Control Chart (10/95 to 10/02)

- 23 events severity weighted 2, 3, or 4
 - Baseline: 21 events
 - Review: 2 events
- Static performance during baseline
- Improving performance during review period—no further evaluation

Types of Small Division Environmental Occurrences



Environmental Occurrences by Type Baseline vs. Review

- Disappearance of predominant historical type of Noncompliance for review period
- Increase in Enforcement Actions from 14% to 50% (1 event)
- Emergence of Hazardous Substance Release type (1 event)

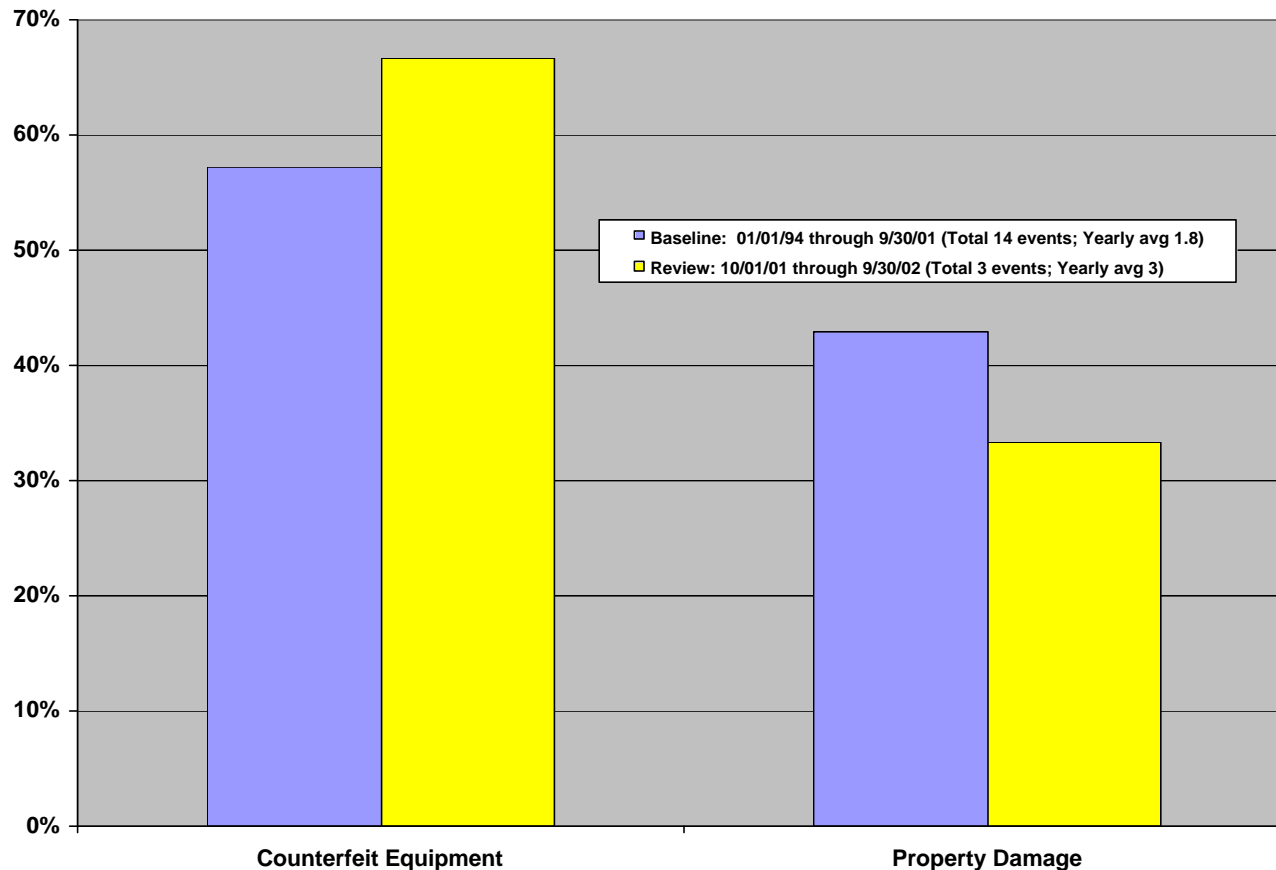
Small Division Property/Equipment Problems Occurrence Performance



Property/Equipment
Problems Control Chart
(1/94 to 10/02)

- 17 events severity weighted 2 or 4
 - Baseline: 14 events
 - Review: 3 events
- Static performance during baseline and review periods

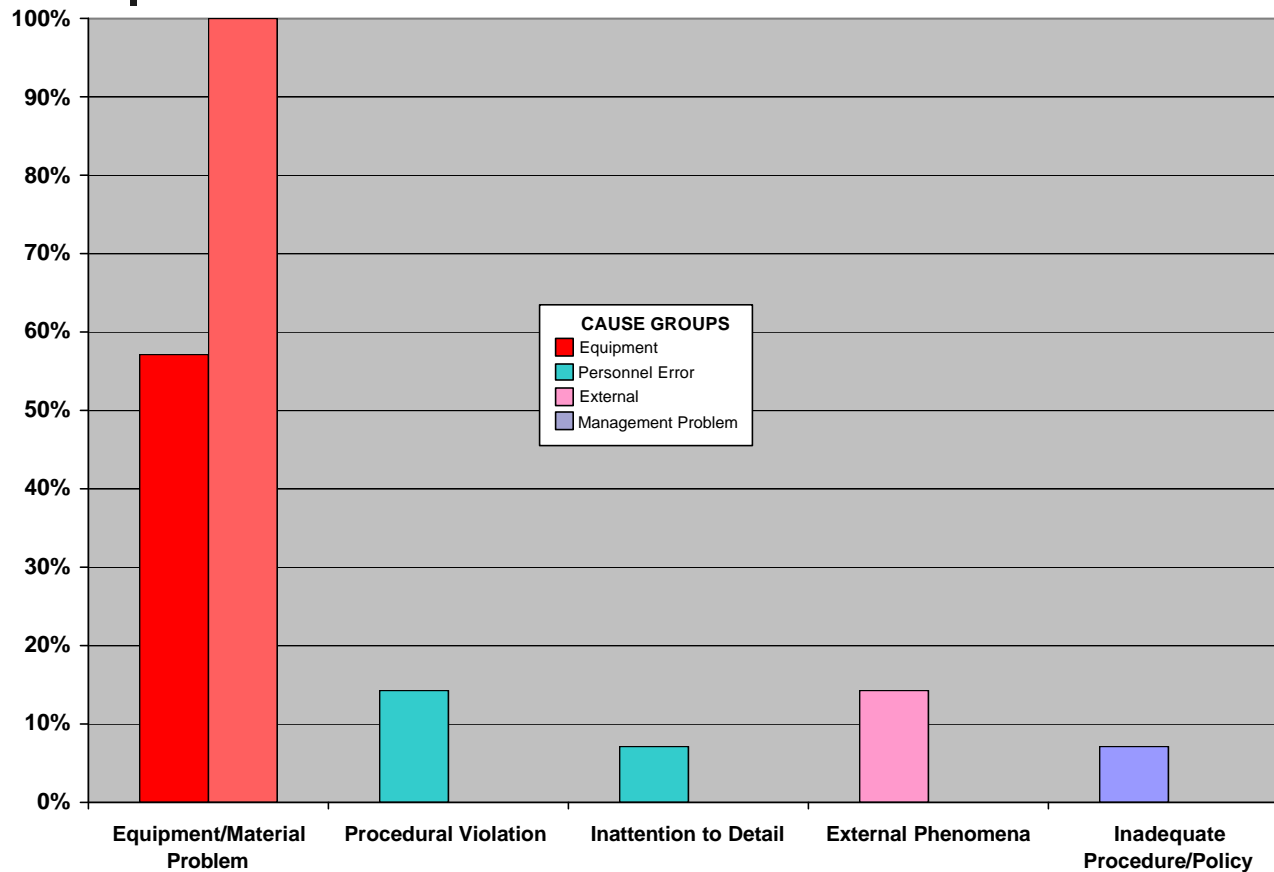
Types of Small Division Property/Equipment Occurrences



Property/Equipment Occurrences by Type Baseline vs. Review

- Static performance for Counterfeit Equipment and Property Damage occurrences
- Counterfeit Equipment increases from 57% in baseline to 67% in review
- Property damage decreases from 43% in baseline to 32% in review

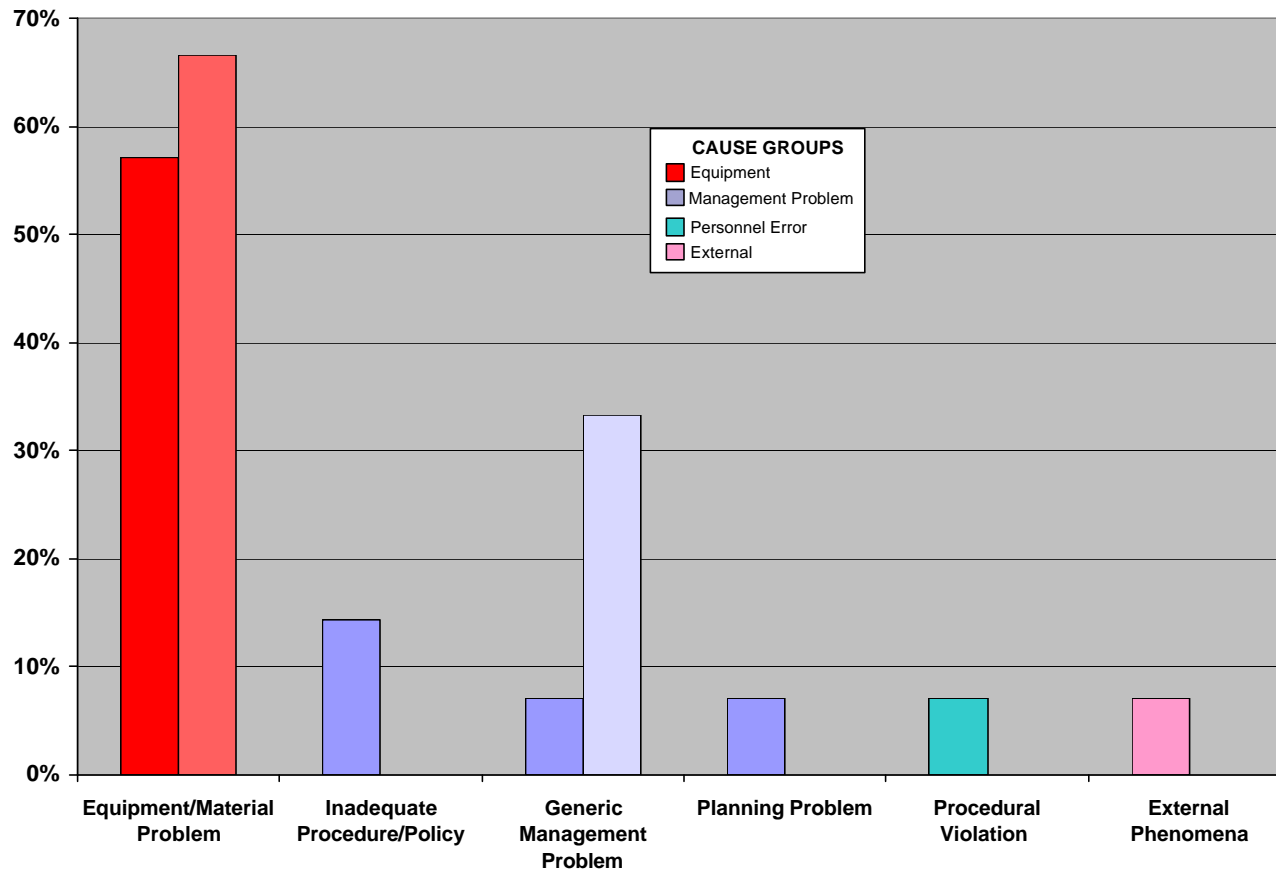
Direct Causes of Small Division Property/Equipment Problems



Direct Causes Baseline vs. Review

- Equipment Failure identified as direct cause in more than 50% of baseline and 100% of review period
- Disappearance of other types of direct causes for review period

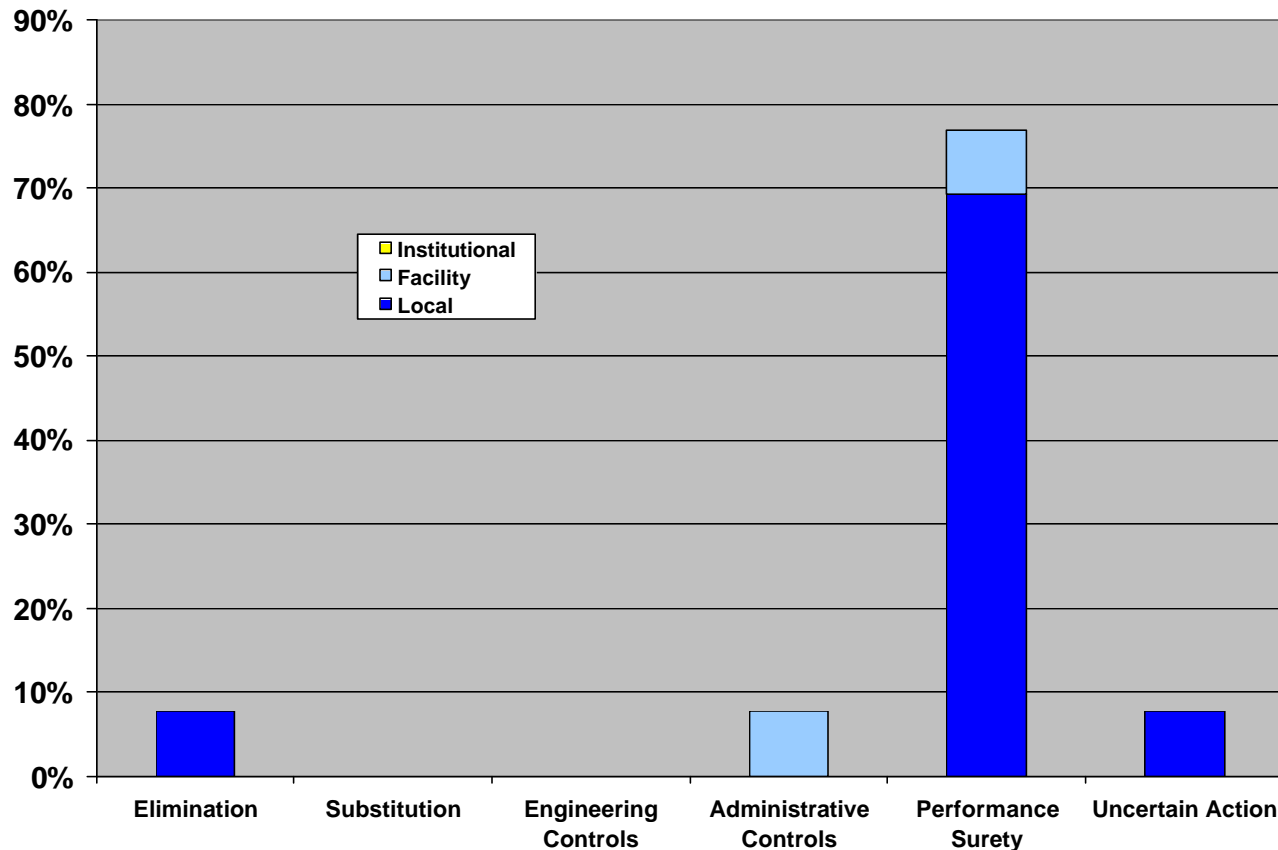
Root Causes of Small Division Property/Equipment Problems



Root Causes Baseline vs. Review

- Equipment Failure identified as root cause in nearly 60% of baseline and 70% of review period—matching profile of direct causes
- Disappearance of other types of root causes for review period—with exception of Generic Management Problem

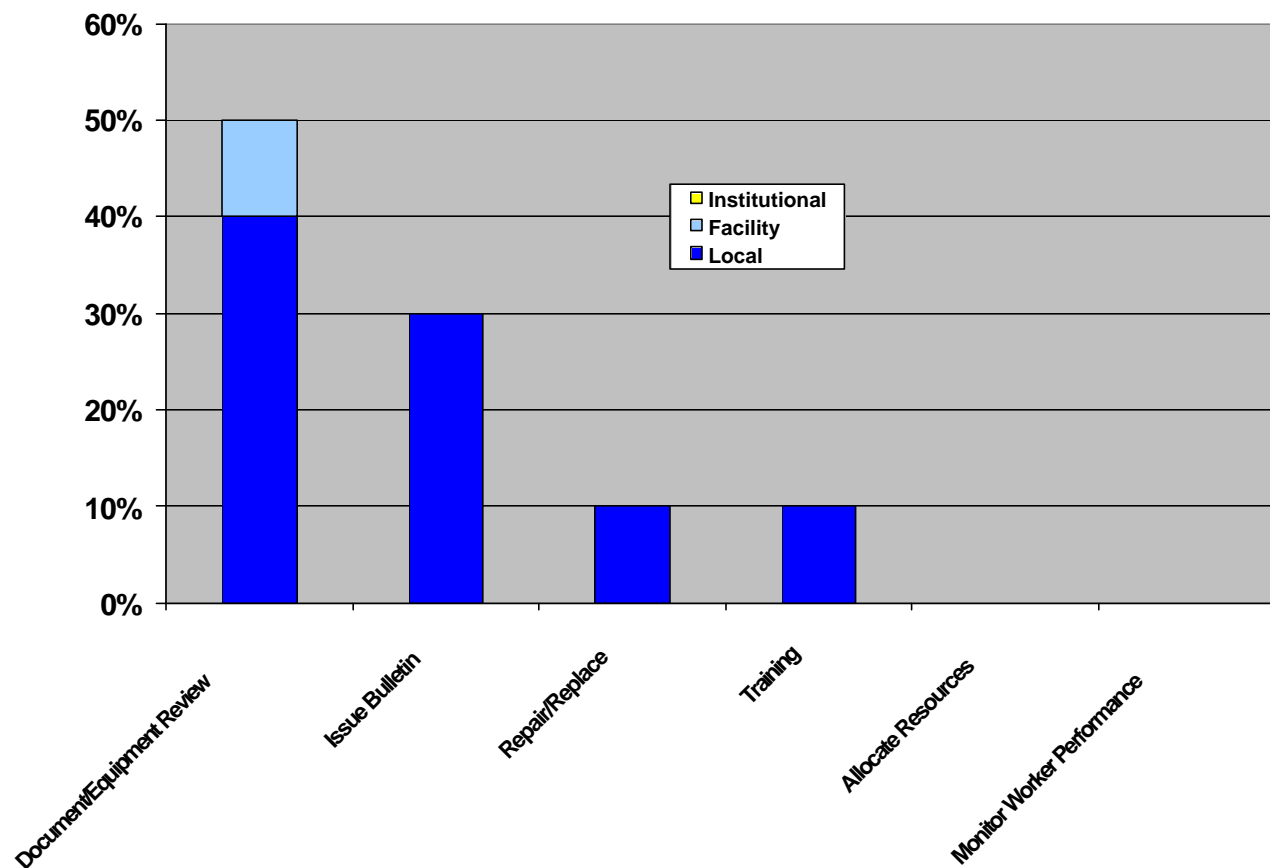
Profile of Corrective Actions for Small Division Property/Equipment Problems



Corrective Actions (10/01/99 to Present)

- About 8% of actions target eliminating or substituting for lesser hazard
- No actions specify new or modified engineering barriers
- Nearly 80% of all actions target "performance surety" actions
- 100% of actions at facility or local level

Performance Surety Actions for Small Division Property/Equipment Problems



Performance Surety Actions (10/01/99 to Present)

- 100% of performance surety actions involve local or facility response to Property/Equipment problems—document or equipment reviews, issuance of bulletins, repairs, and training
- No actions targeted at institutional level
- No actions targeted at active worker monitoring



LANL Safety Function Review

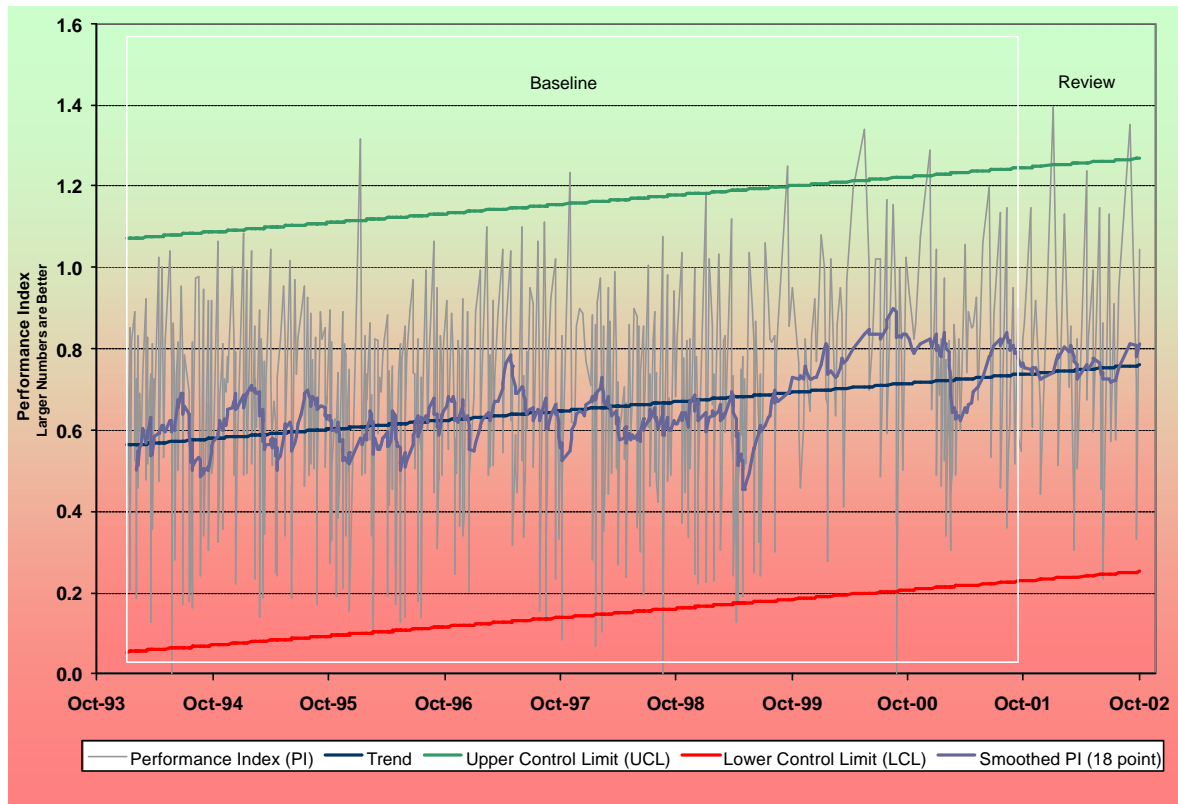
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Radiological Protection Occurrences

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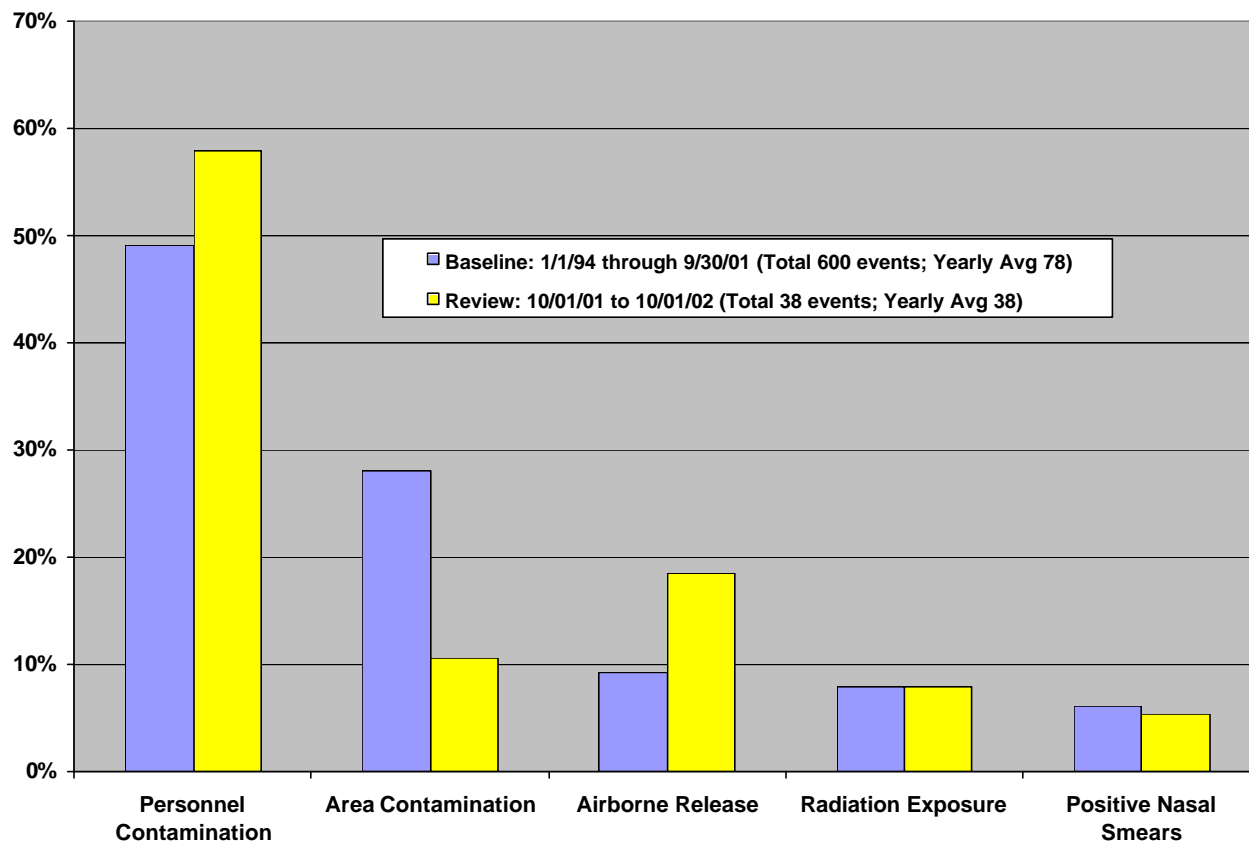
LANL Radiological Protection Occurrence Performance



Radiological Protection PI Control Chart (1/94 to 10/02)

- 638 total events severity weighted 2, 3, or 4
 - Baseline: 600 events
 - Review: 38 events
- Improving performance during baseline
- Continuing improved performance for review period

Type Distribution of LANL Radiological Protection Occurrences

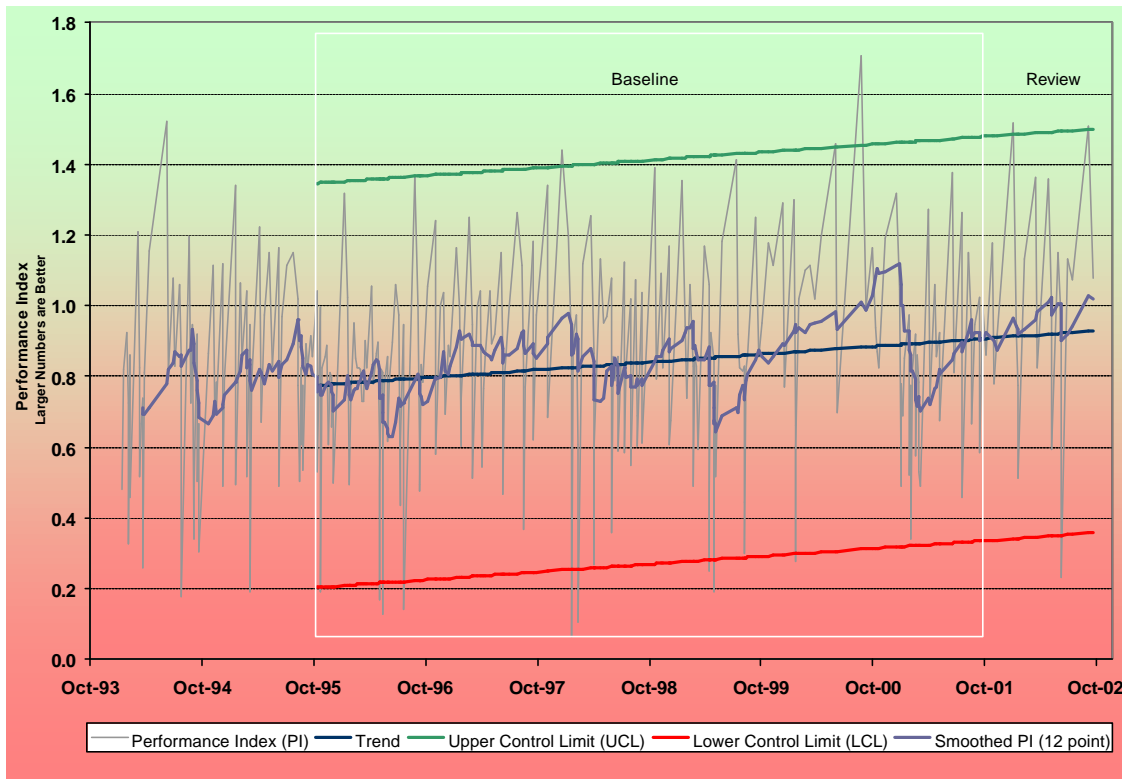


Radiological Protection Occurrences by Type Baseline vs. Review

- Personnel contamination events account for nearly 50% in baseline and 60% in review period
- Significant reduction in area contamination events
- Emergence of Airborne Release events as second leading type during review period

LANL Personnel Contamination Occurrence Performance

Personnel Contamination Control Chart (1/94 to 10/02)

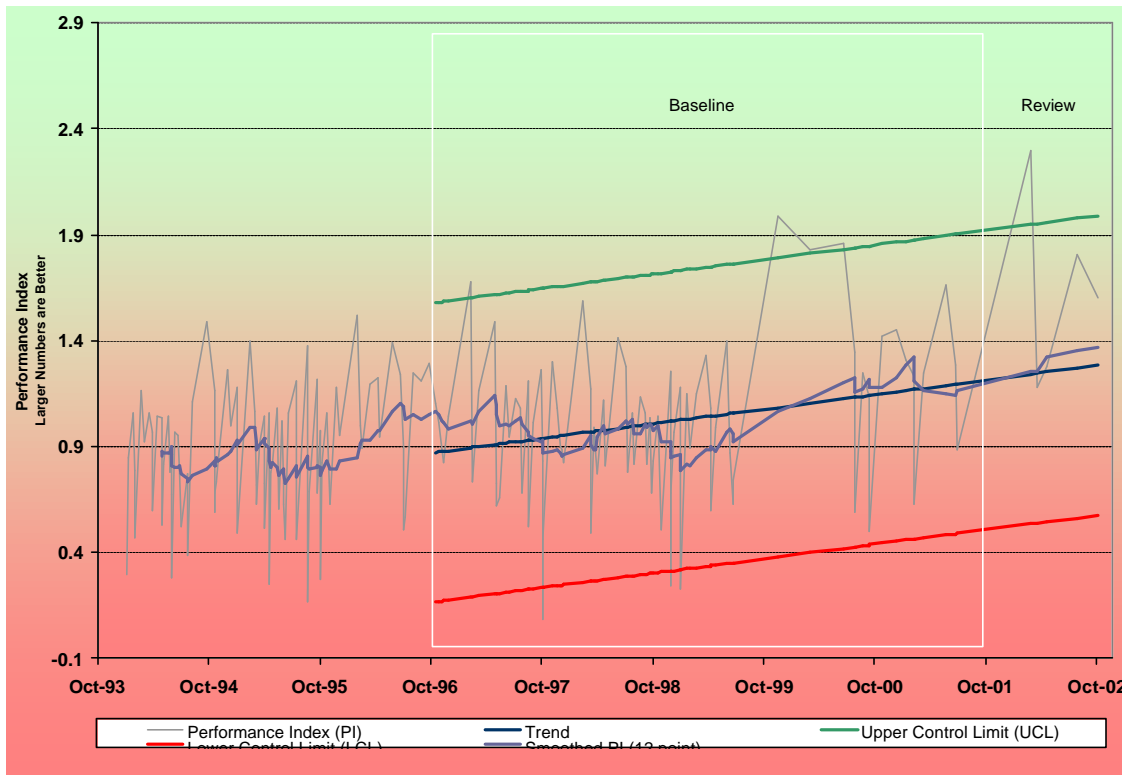


- 316 total events severity weighted 2, 3, or 4
 - Pre-Baseline: 71 events
 - Baseline: 223 events
 - Review: 22 events
- Overall PI improvement since 1994
- Improving performance during baseline
- Continuing improved performance for review period—no further evaluation

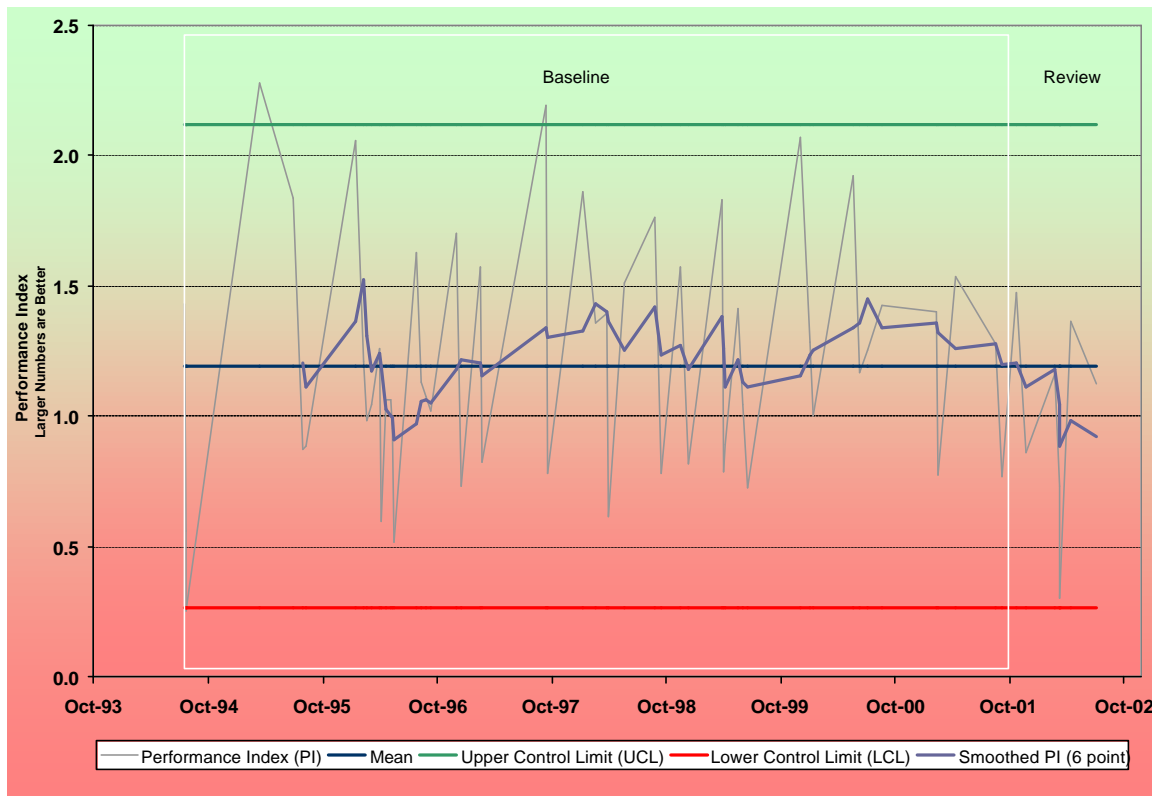
LANL Area Contamination Occurrence Performance

Area Contamination Control Chart (1/94 to 10/02)

- 173 total events severity weighted 2, 3, or 4
 - Pre-Baseline: 83 events
 - Baseline: 85 events
 - Review: 5 events
- Overall PI improvement since 1994
- Improving performance during baseline
- Continuing improved performance for review period—no further evaluation



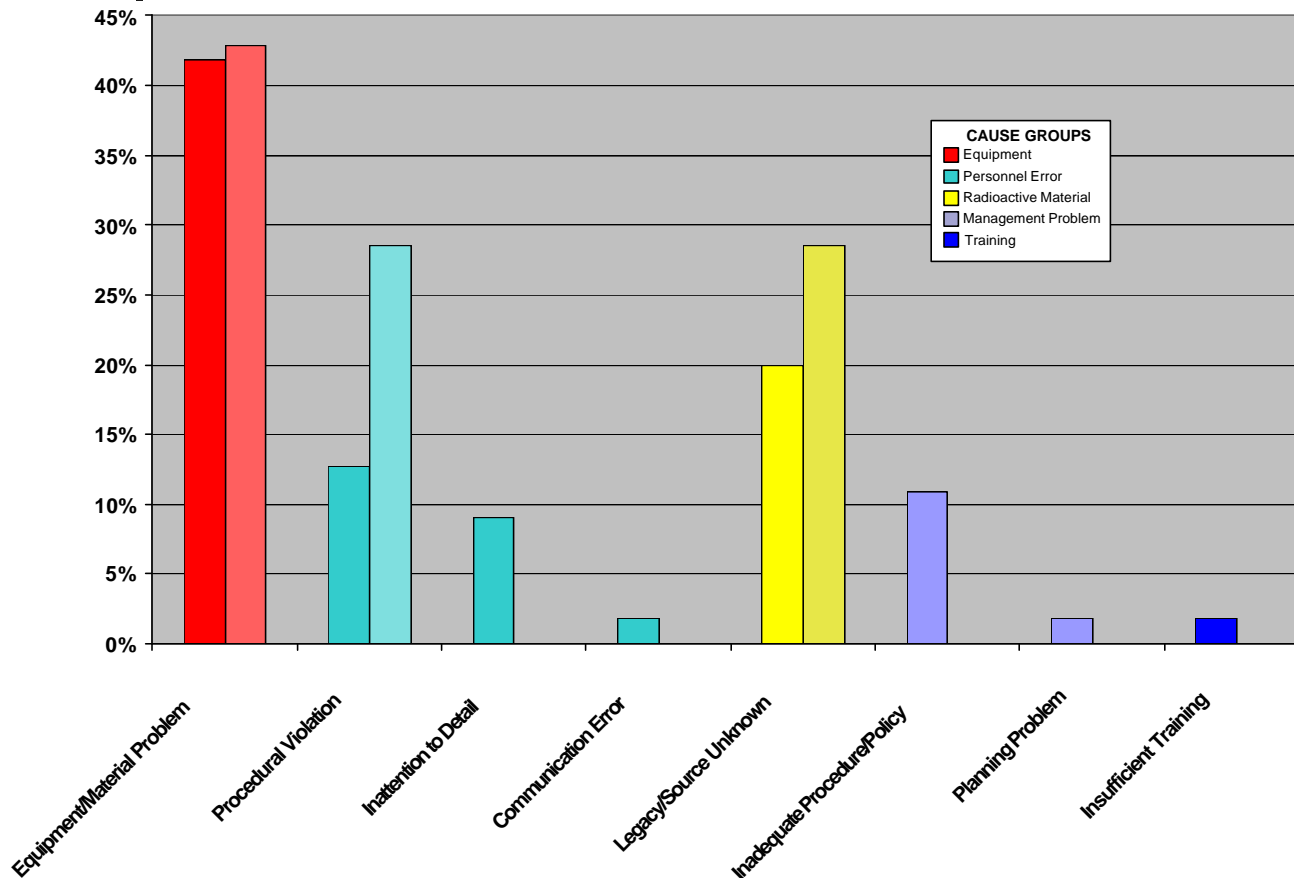
LANL Airborne Release Occurrence Performance



Airborne Release Control Chart (1/94 to 10/02)

- 62 total events severity weighted 2, 3, or 4
 - Baseline: 55 events
 - Review: 7 events
- Static performance during baseline and review periods
- Developing declining performance trend from 12/99 to present

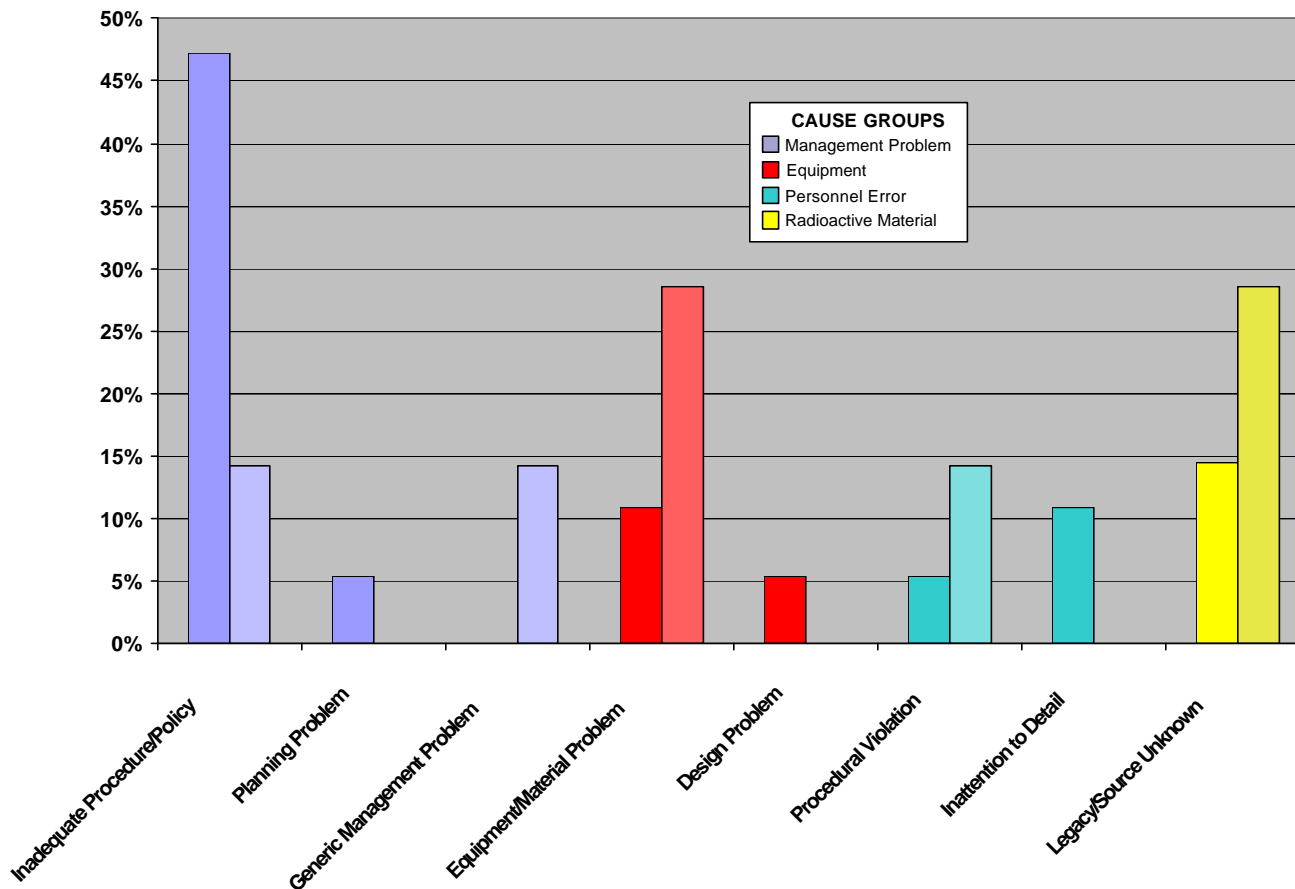
Direct Causes of LANL Airborne Release Occurrences



Direct Causes Baseline vs. Review

- Primary direct cause is equipment problem--over 40% in baseline and review periods
- Procedural violation and legacy contamination or unknown source continue to be leading secondary direct causes

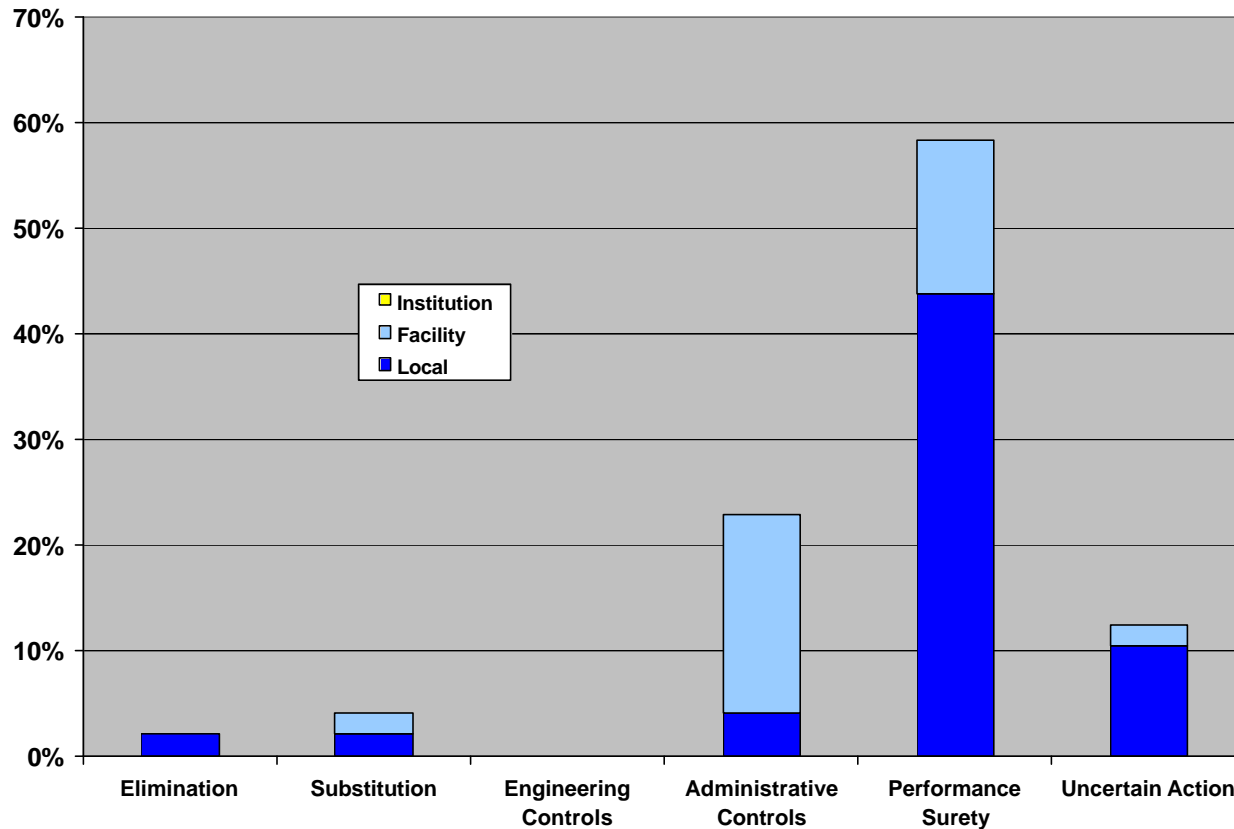
Root Causes of LANL Airborne Release Occurrences



Root Causes Baseline vs. Review

- Management-related causes decreased sharply—from 56% in baseline to 17% in review
- Emergence of Equipment Problem and Legacy Contamination root causes—matching direct causes

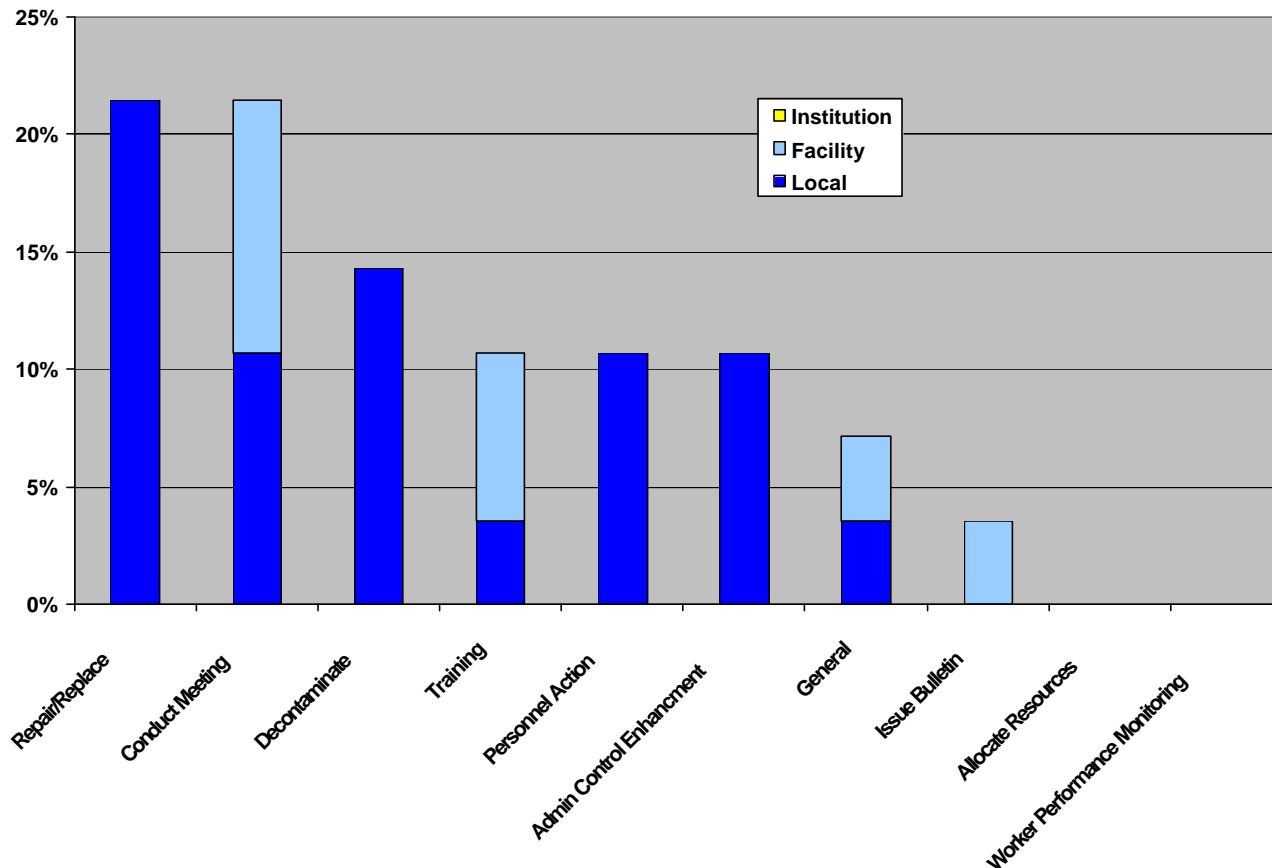
Profile of Corrective Actions for LANL Airborne Release Occurrences



Corrective Actions (10/01/99 to Present)

- Less than 7% of actions target eliminating or substituting for lesser hazard
- No actions specify new or modified engineering barriers
- Over 80% of all actions target procedural changes or "performance surety" actions
- 100% of actions at facility or local level

Performance Surety Actions for LANL Airborne Release Occurrences



Performance Surety Actions (10/01/99 to Present)

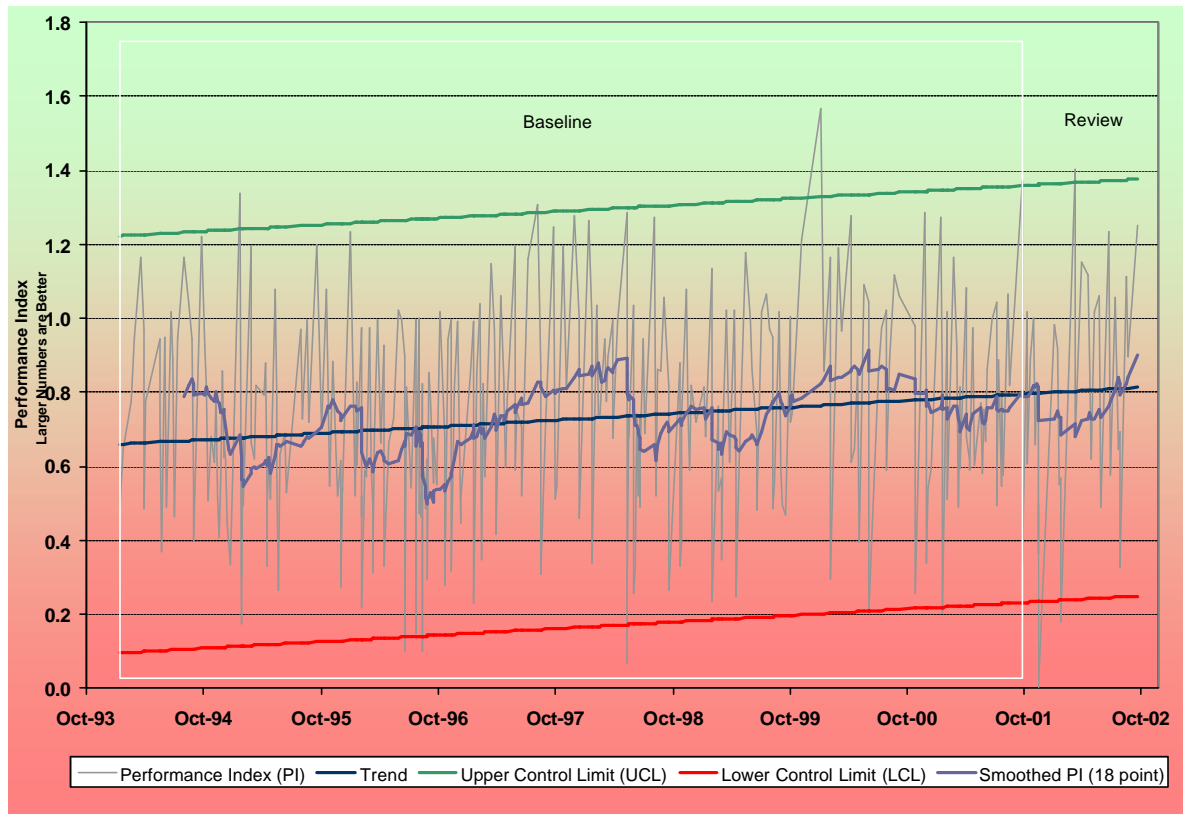
- 21% of performance surety actions involve local one-time repairs of an equipment problem—no actions at facility level
- Of other actions, more than 50% involve reactive, one-time actions—meetings, memos, decon, etc.



Personnel Safety Occurrences

FY2002

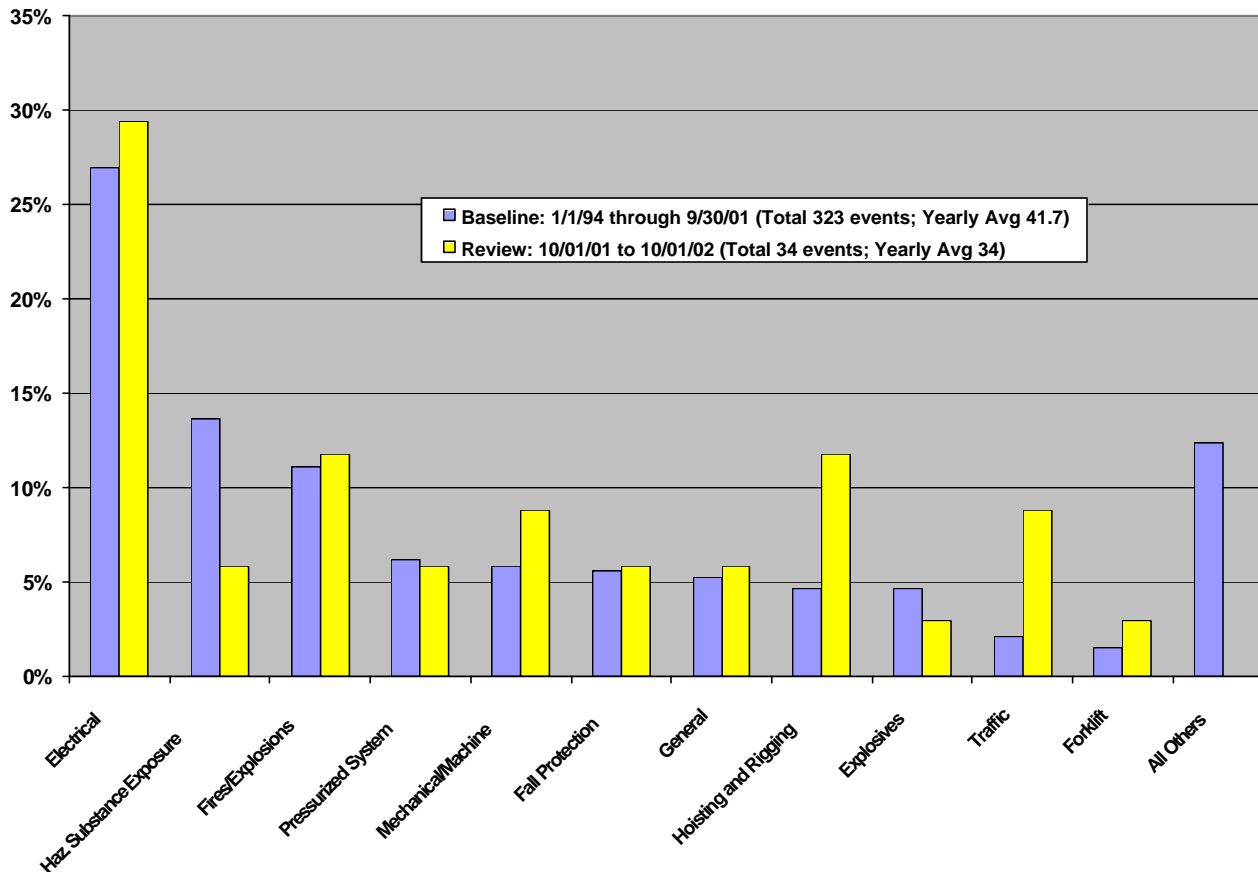
LANL Personnel Safety Occurrence Performance



Personnel Safety PI Control Chart
(1/94 to 10/02)

- 357 total events severity weighted 2, 3, or 4
 - Baseline: 323 events
 - Review: 34 events
- Improving performance during baseline
- Continuing improved performance for review period

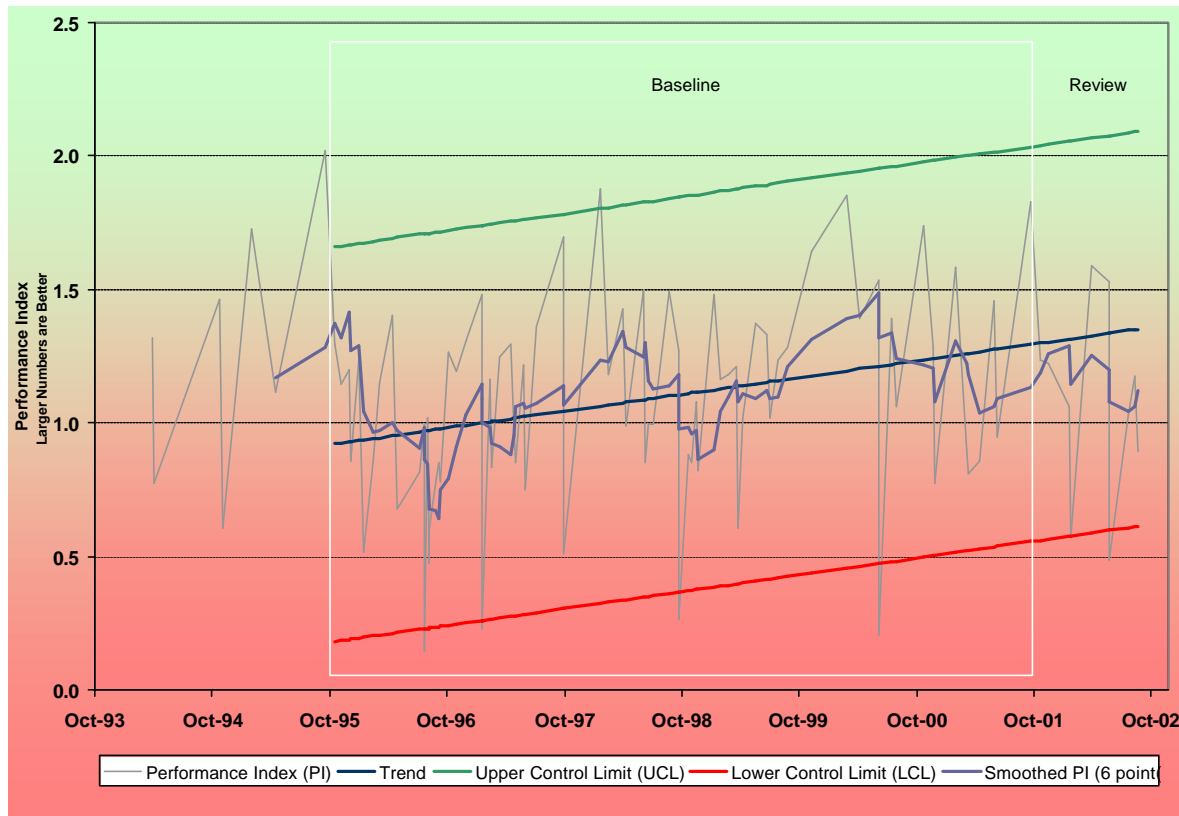
Type Distribution of LANL Personnel Safety Occurrences



Personnel Safety Occurrences by Type Baseline vs. Review

- Electrical safety events are significant predominant type-- over 25% in baseline and nearly 30% in review period
- Relatively uniform distribution of all remaining types during review and baseline— collective performance review

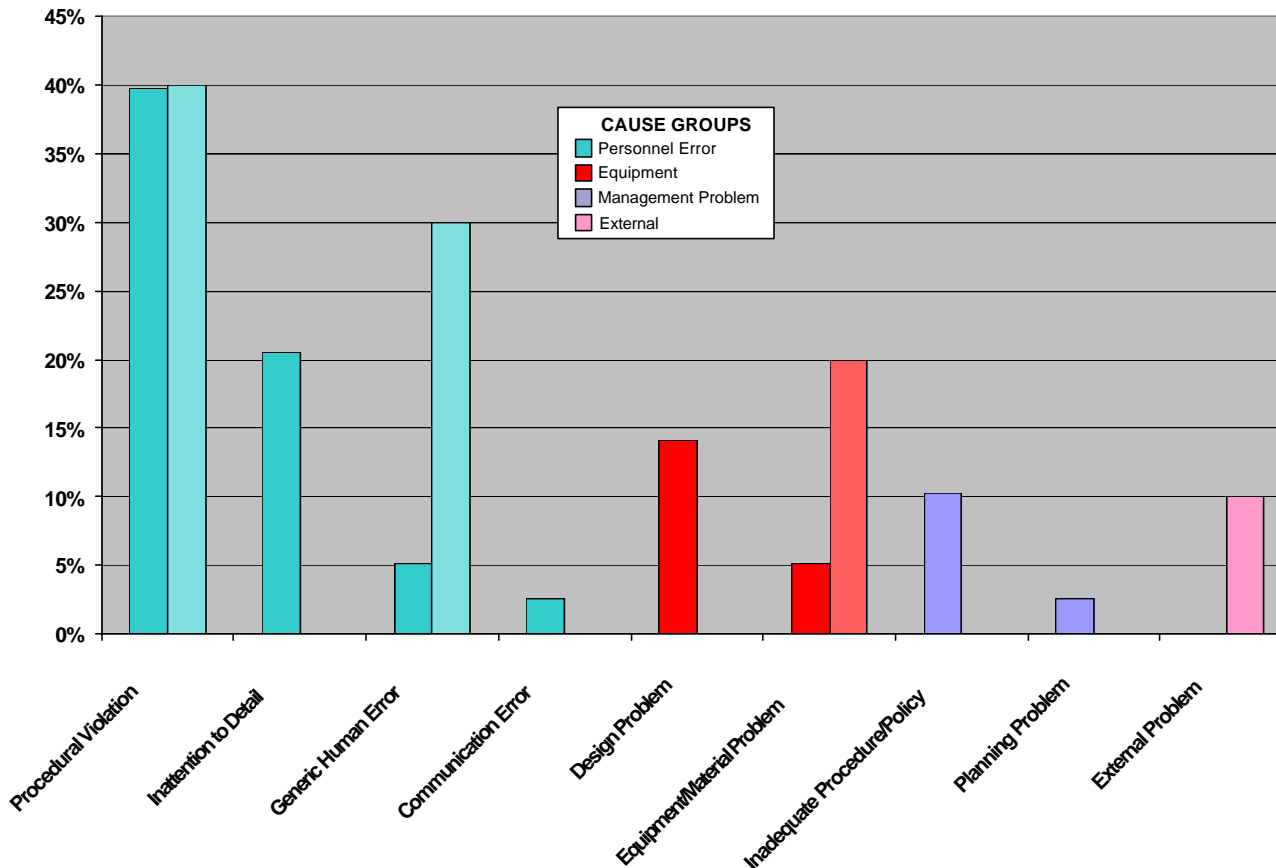
LANL Electrical Safety Occurrence Performance



Electrical Safety Control Chart
(1/94 to 10/02)

- 97 total events severity weighted 2, 3, or 4
 - Pre-Baseline: 8 events
 - Baseline: 79 events
 - Review: 10 events
- Overall PI improvement since 1994
- Improving performance during baseline
- Static performance for review period

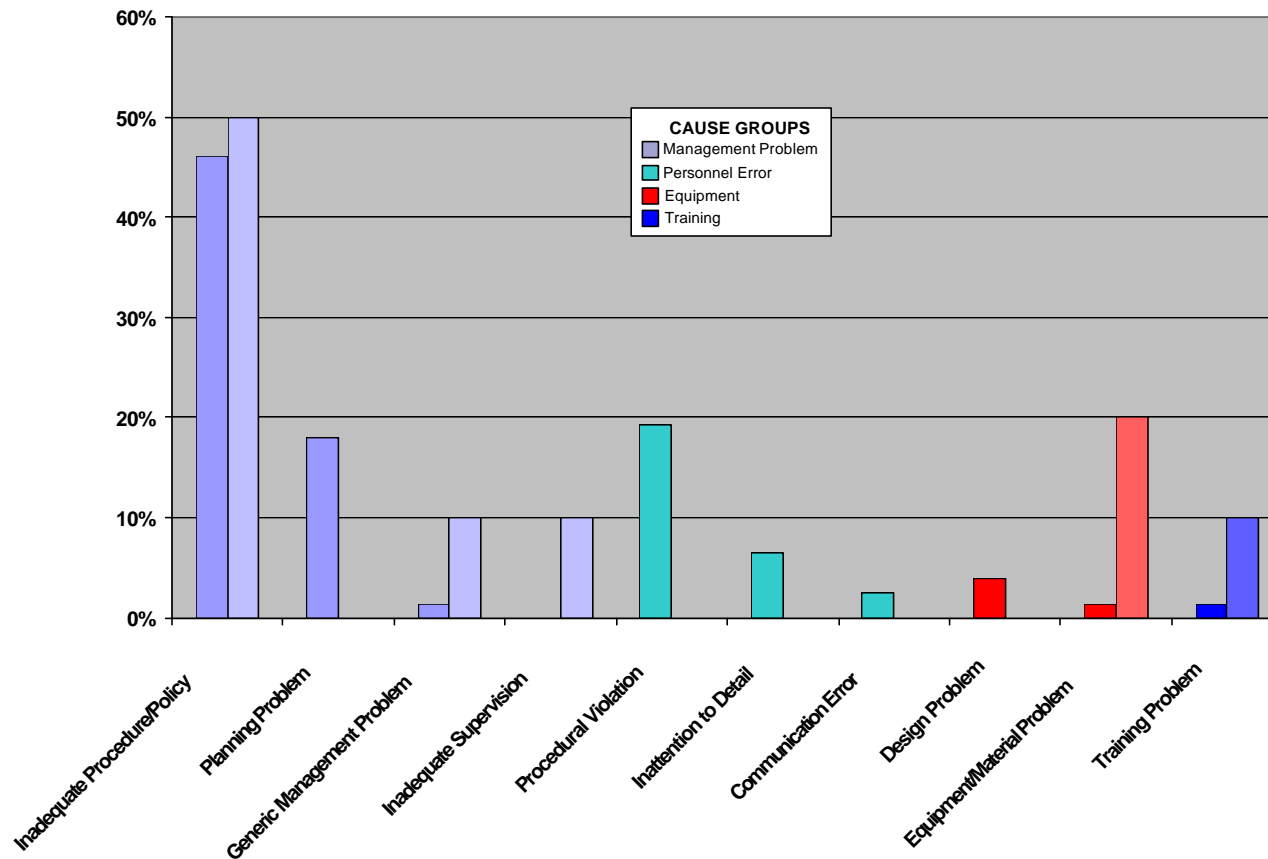
Direct Causes of LANL Electrical Safety Occurrences



Direct Causes Baseline vs. Review

- Personnel Error is the direct cause of nearly 70% of all electrical safety events
- More than half of the personnel errors involve violations of procedure

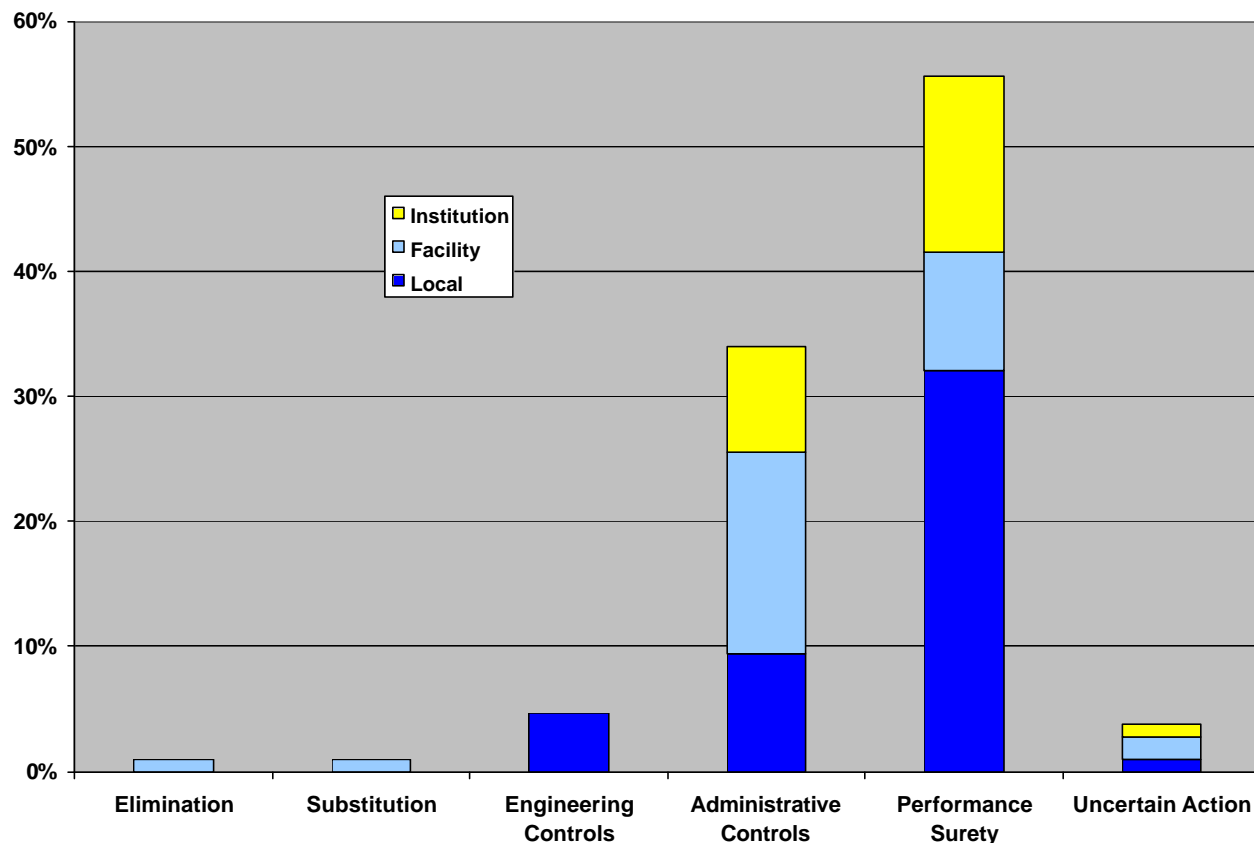
Root Causes of LANL Electrical Safety Occurrences



Root Causes Baseline vs. Review

- Primary root cause is inadequate procedures or policies—nearly 50% in baseline and review periods
- No personnel errors noted as root cause during review period

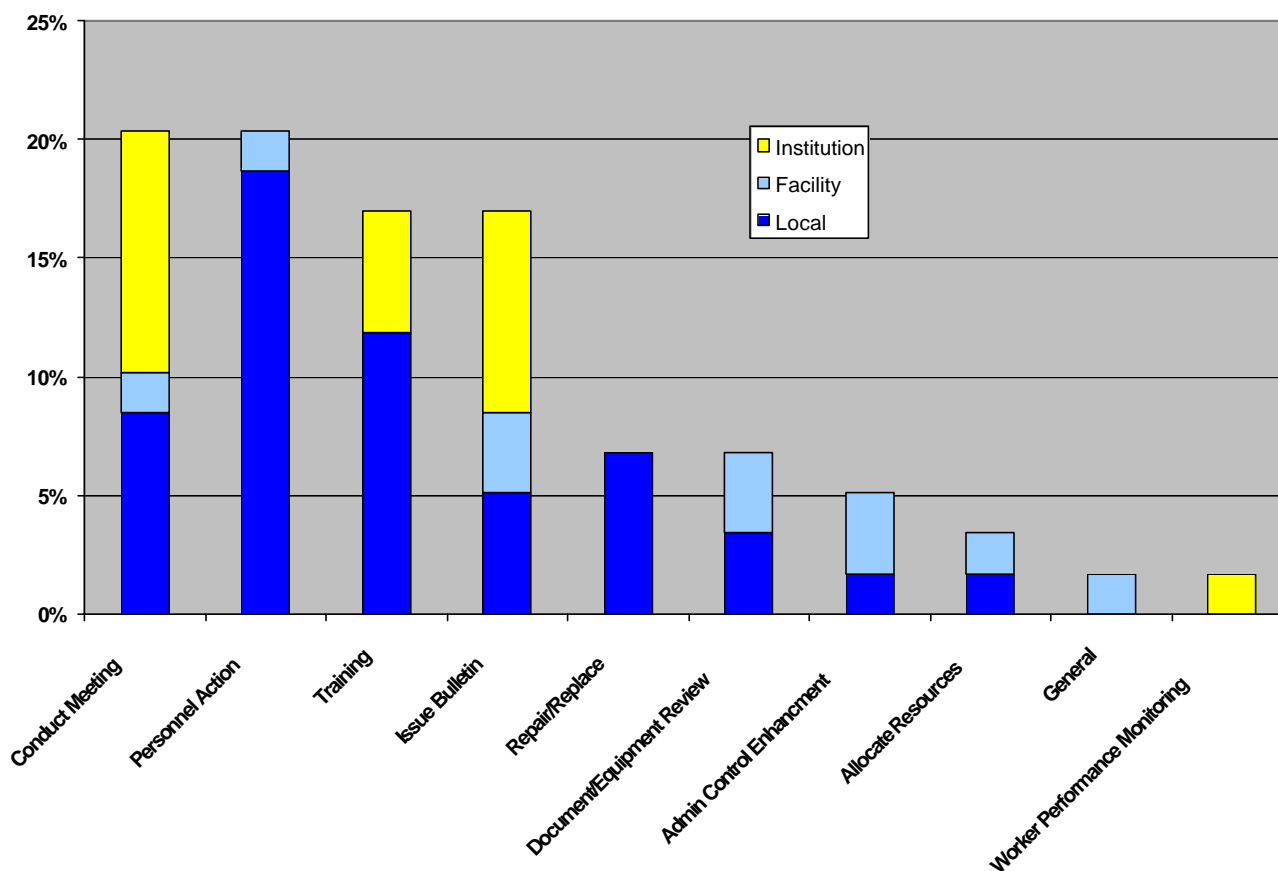
Profile of Corrective Actions for LANL Electrical Safety Occurrences



Corrective Actions (10/01/99 to Present)

- Less than 2% of actions target eliminating or substituting for lesser hazard
- Less than 5% specify new or modified engineering barriers
- Nearly 90% of all actions are administrative in nature—34% involve procedural changes and 56% “performance surety”
- Most actions at facility or local level

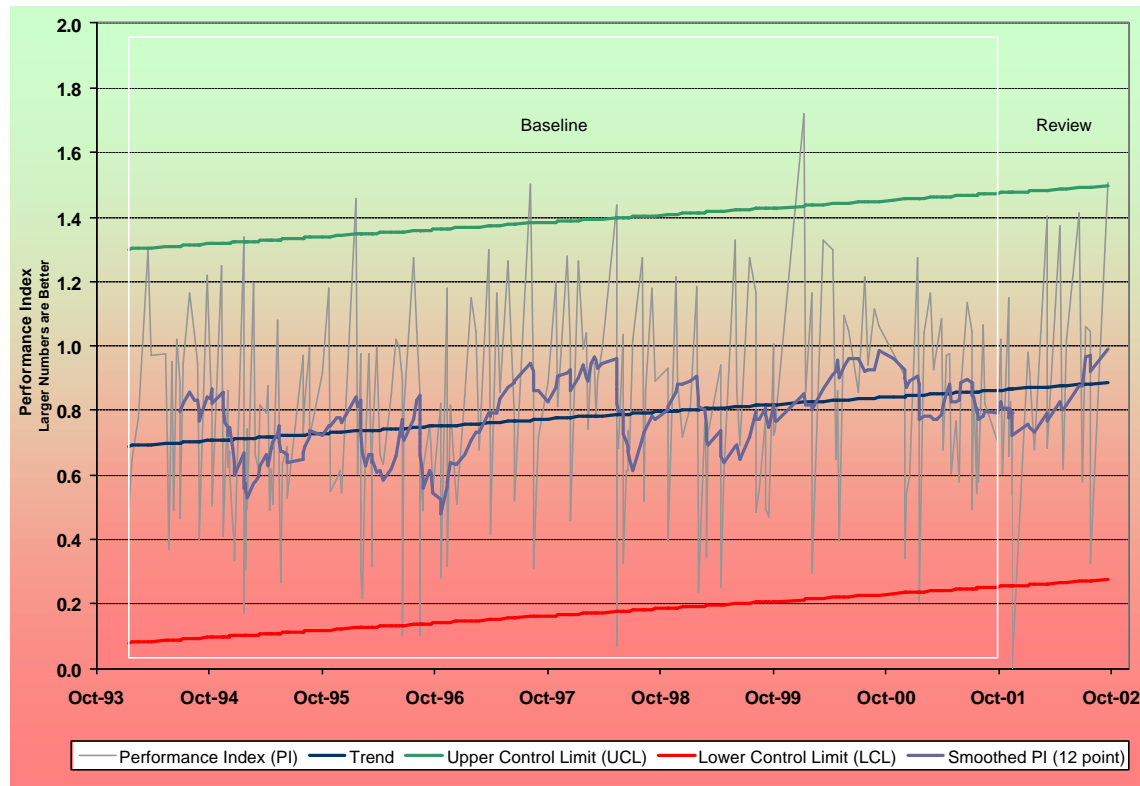
Performance Surety Actions for LANL Electrical Safety Occurrences



Performance Surety Actions (10/01/99 to Present)

- Over 88% of performance surety actions involve reactive, one-time actions—meetings, bulletins, single training, equipment reviews, etc.
- Less than 2% involve active worker performance monitoring
- Most actions at local level

LANL Personnel Safety *Non-Electrical* Occurrence Performance



Personnel Safety *non-electrical* Control Chart
(1/94 to 10/02)

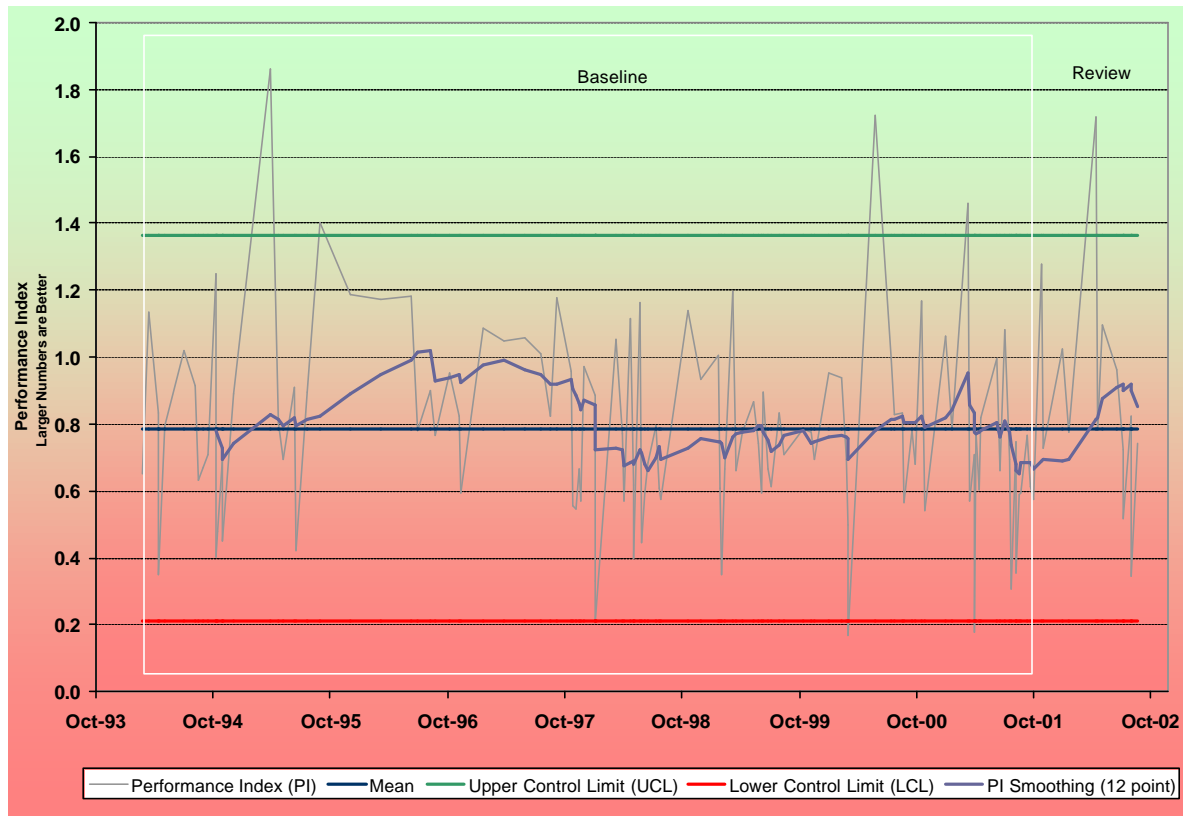
- 260 total events severity weighted 2, 3, or 4
 - Baseline: 236 events
 - Review: 24 events
- Overall PI improvement since 1994
- Improving performance during baseline
- Continuing improved performance for review period—no further evaluation



Authorization Basis Occurrences

FY2002

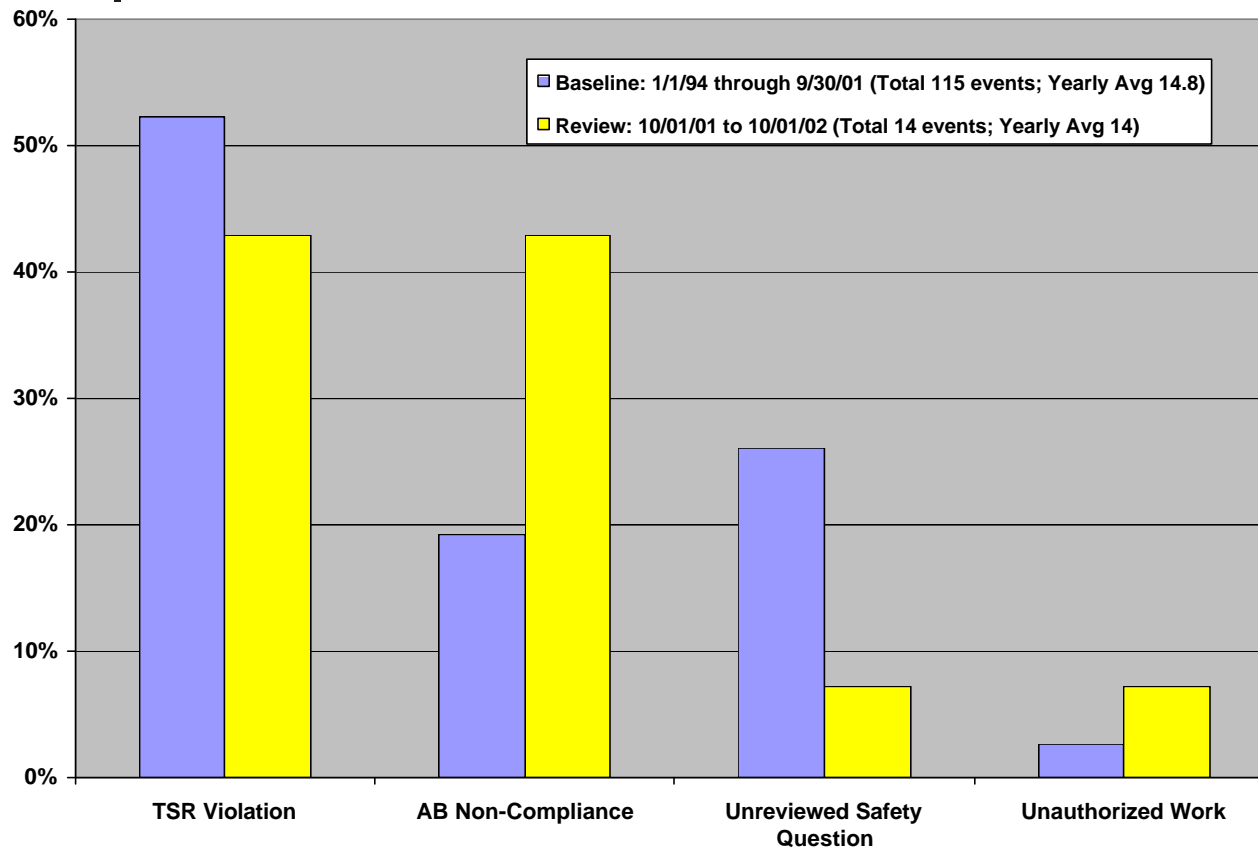
LANL Authorization Basis Occurrence Performance



Authorization Basis PI
Control Chart
(1/94 to 10/02)

- 129 total events severity weighted 2, 3, or 4
 - Baseline: 115 events
 - Review: 14 events
- Static performance during baseline
- Static performance for review period

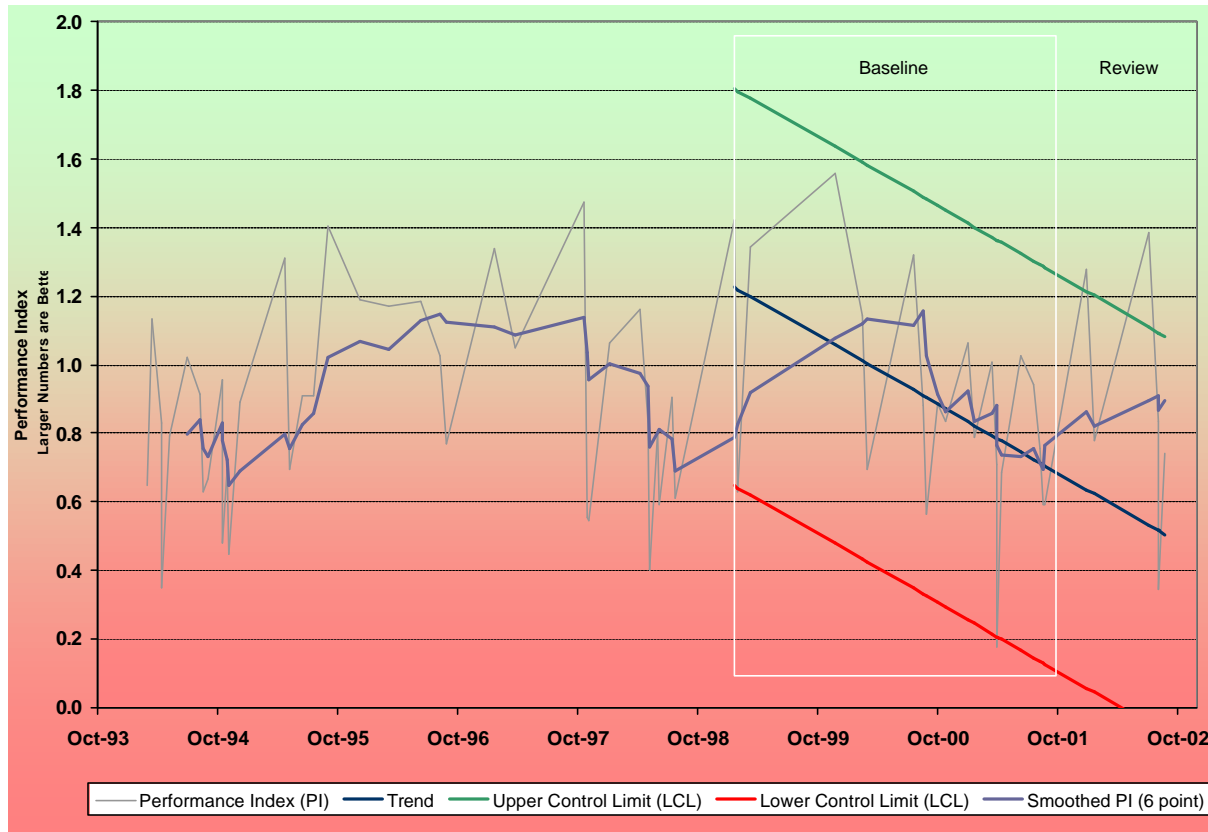
Type Distribution of LANL Authorization Basis Occurrences



Authorization Basis Occurrences by Type Baseline vs. Review

- TSR Violations are predominant type—over 50% in baseline and 40% in review
- Emergence of AB non-compliance events (not-TSR violations) as predominant type in review period

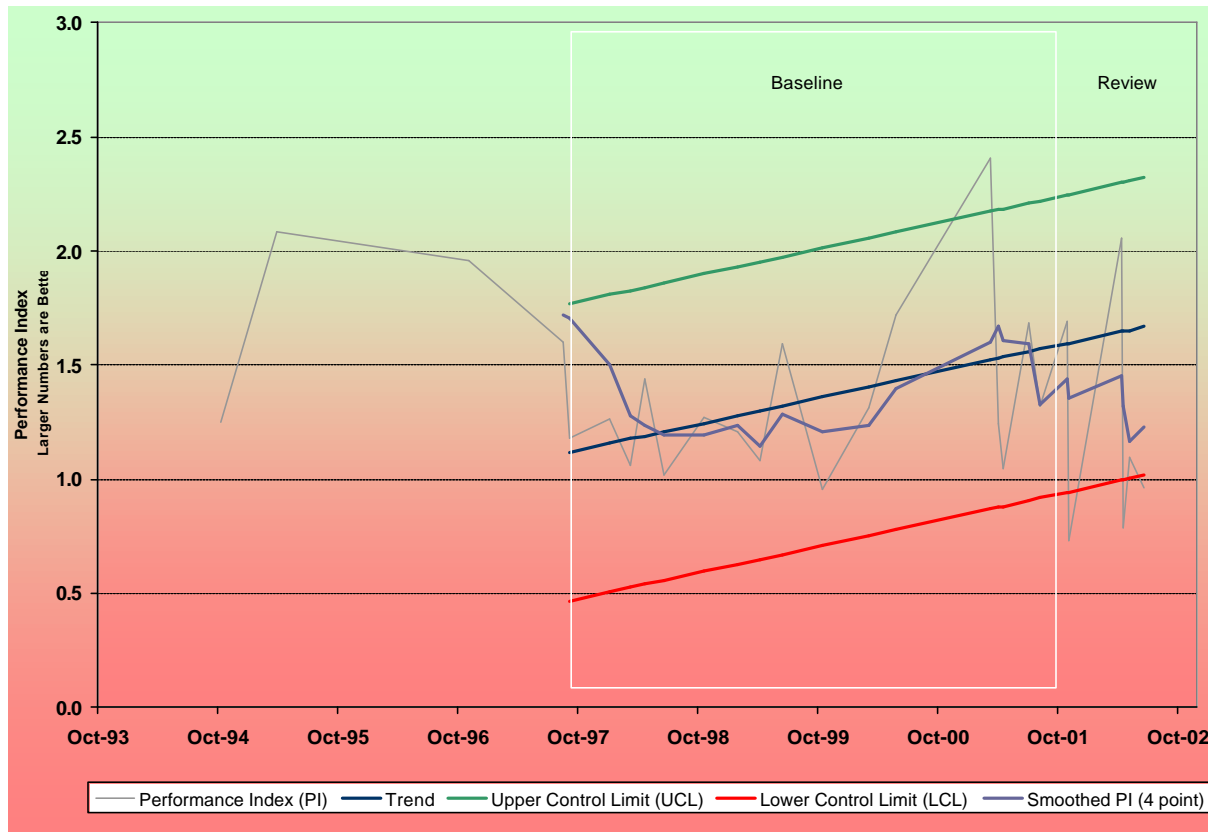
LANL TSR Violation Occurrence Performance



TSR Violation Control Chart
(1/94 to 10/02)

- 66 total events severity weighted 2 or 3. No high severity (level 4) events
 - Pre-Baseline: 38 events
 - Baseline: 22 events
 - Review: 6 events
- Declining performance during baseline
- Improving performance for review period—no further evaluation

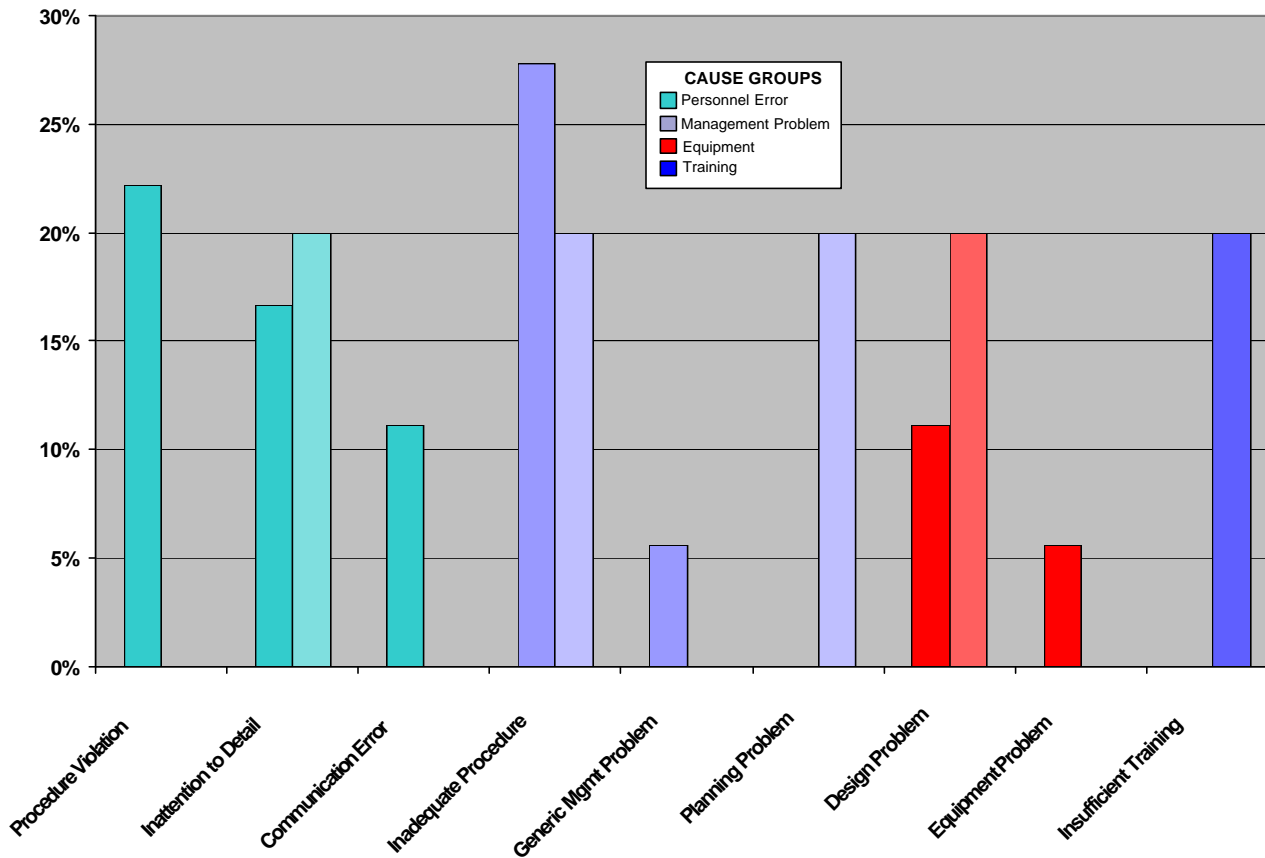
LANL AB Non-Compliance Occurrence Performance



AB Non-Compliance Control Chart (1/94 to 10/02)

- 28 total events severity weighted 2, 3, or 4.
 - Pre-Baseline: 5 events
 - Baseline: 18 events
 - Review: 5 events
- Improving performance during baseline
- Declining performance for review period

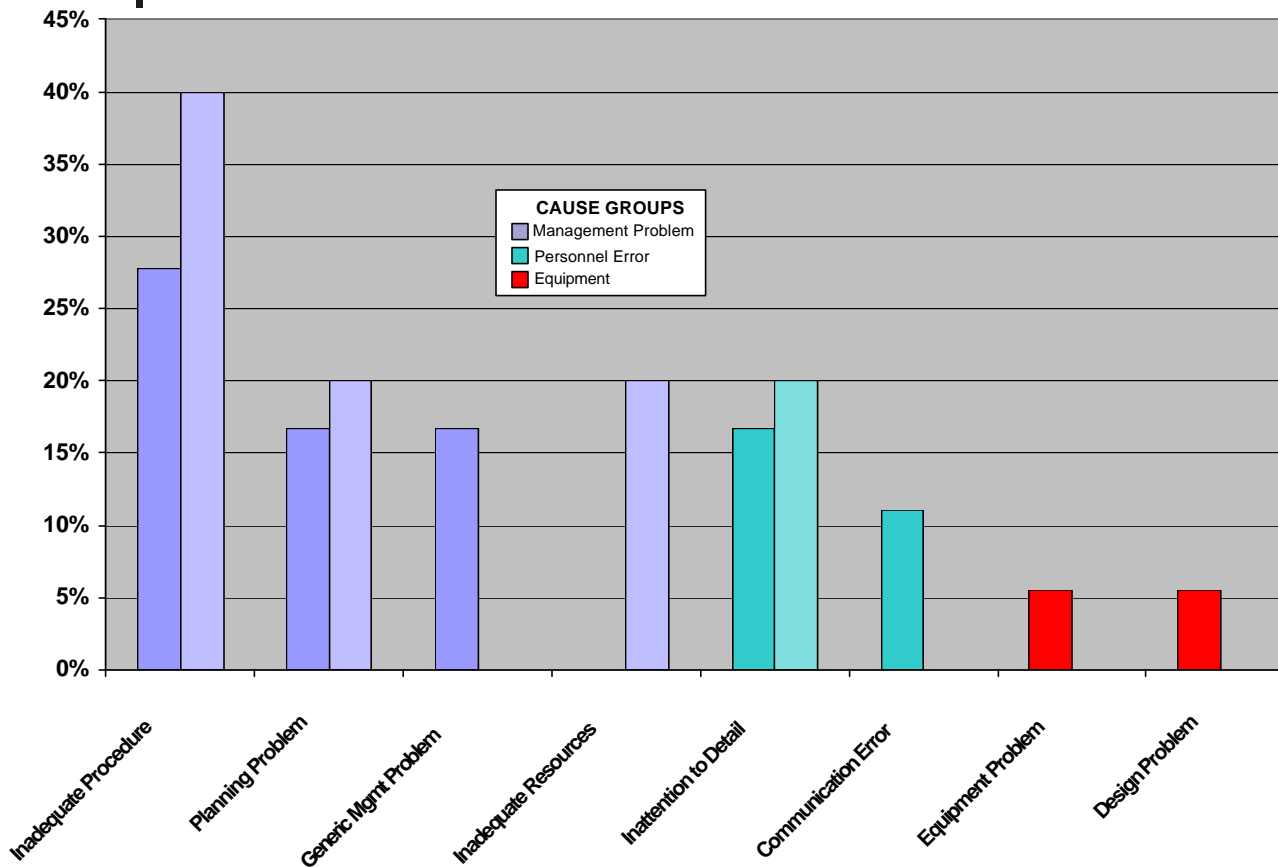
Direct Causes of LANL AB Non-Compliances



Direct Causes Baseline vs. Review

- Personnel Error and Inadequate Procedures were the primary direct causes in the baseline period
- Direct causes in review period continue to be relatively consistent with baseline

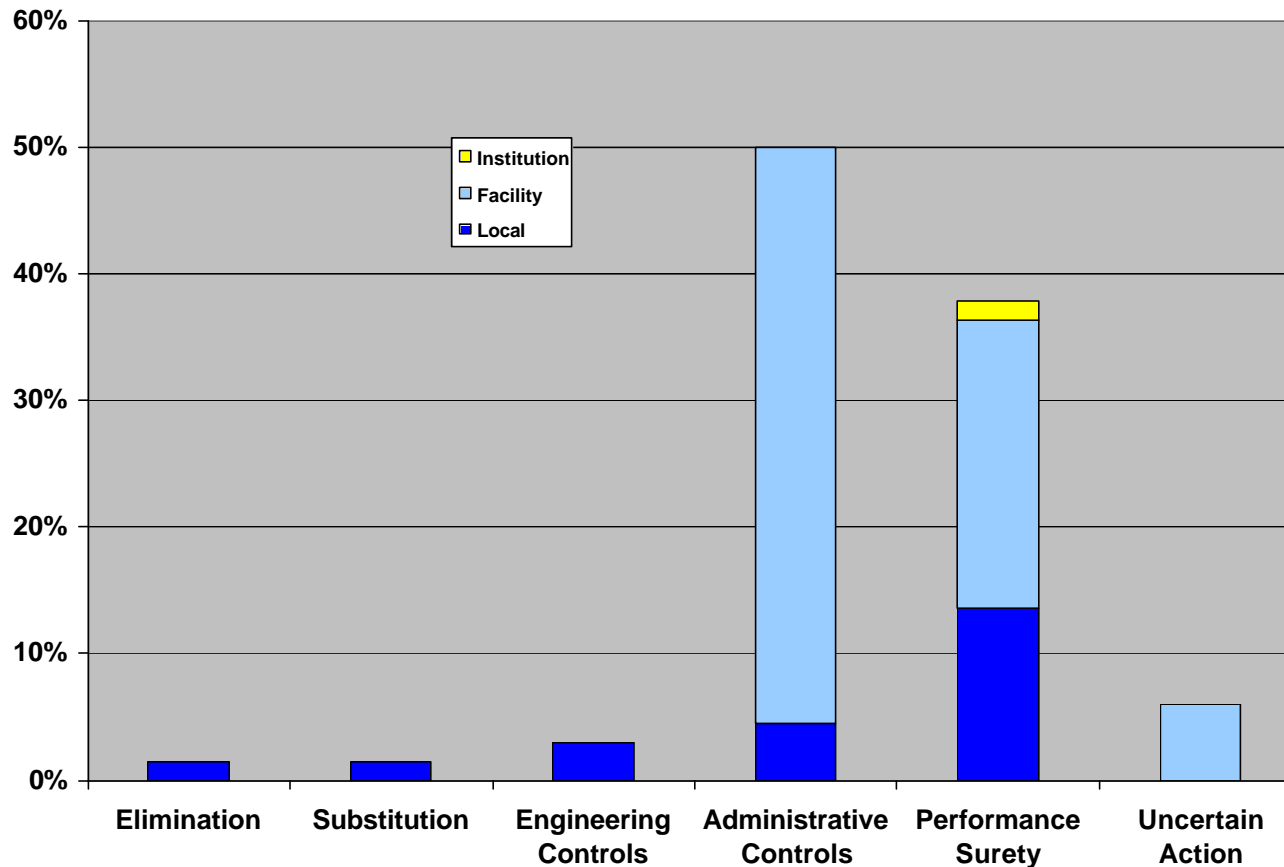
Root Causes of LANL AB Non-Compliances



Root Causes Baseline vs. Review

- Principal root causes for AB Non-Compliances relatively consistent from baseline to review periods -- Inadequate procedures, planning problems, and personnel errors

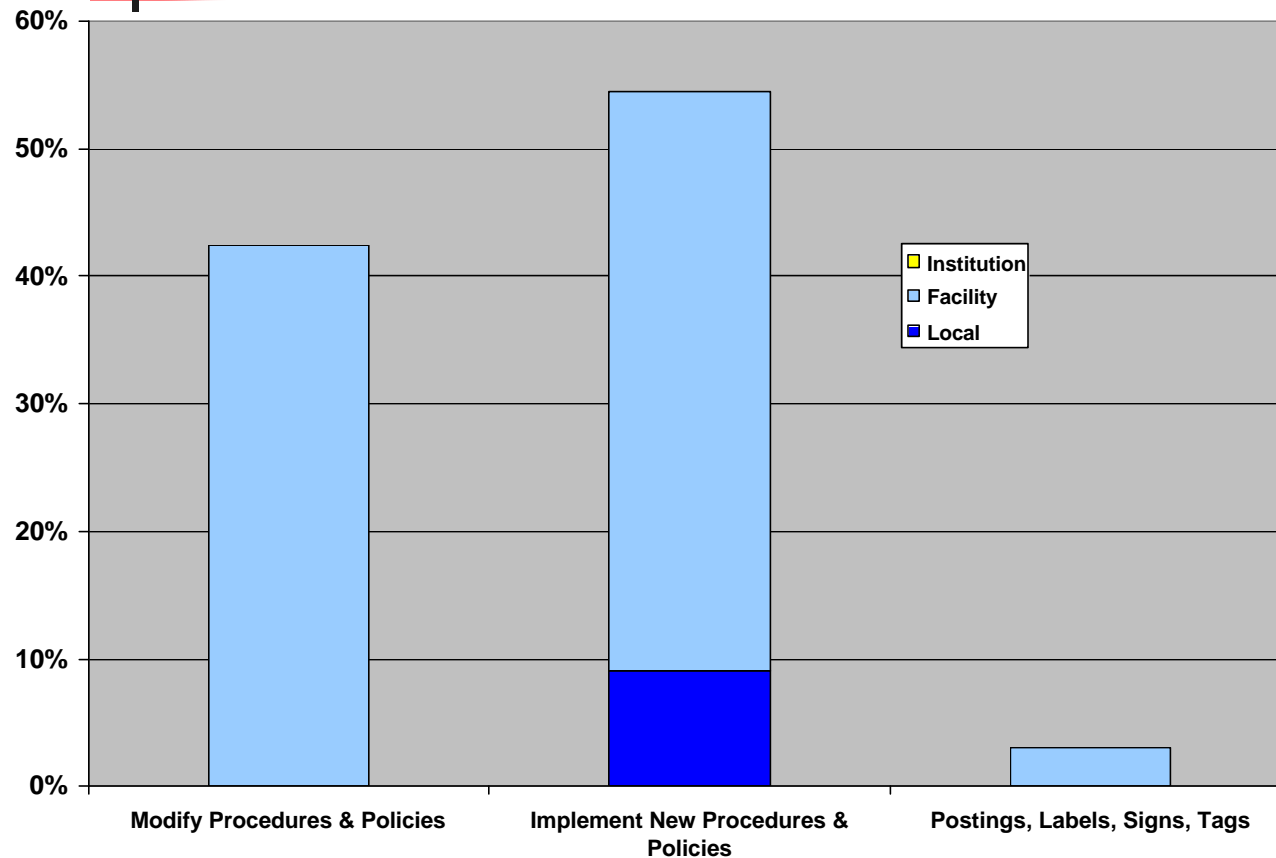
Profile of Corrective Actions for LANL AB Non-Compliances



Corrective Actions (10/99 to Present)

- Over 85% of the corrective actions are administrative in nature—50% involve new or modified procedures with 38% being “performance surety” type actions
- Most actions at facility level
- Less than 2% of actions at institutional level

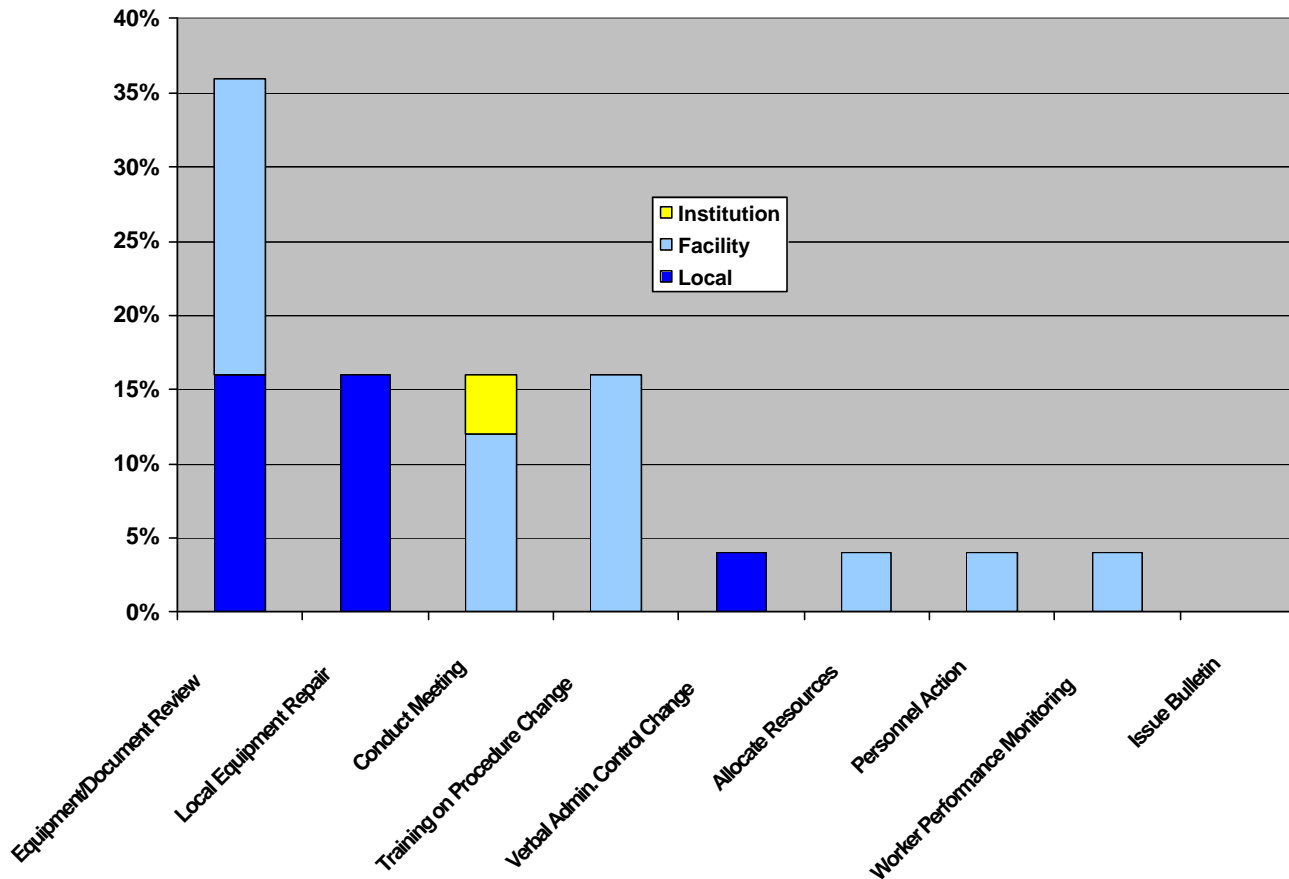
Administrative Control Actions for LANL AB Non-Compliances



Administrative Control Actions (10/99 to Present)

- 54% of the administrative actions involve implementing new procedures and policies
- Nearly all actions at facility level
- No institutional administrative control actions

Performance Surety Actions for LANL AB Non-Compliances



Performance Surety Actions (1/12/98 to Present)

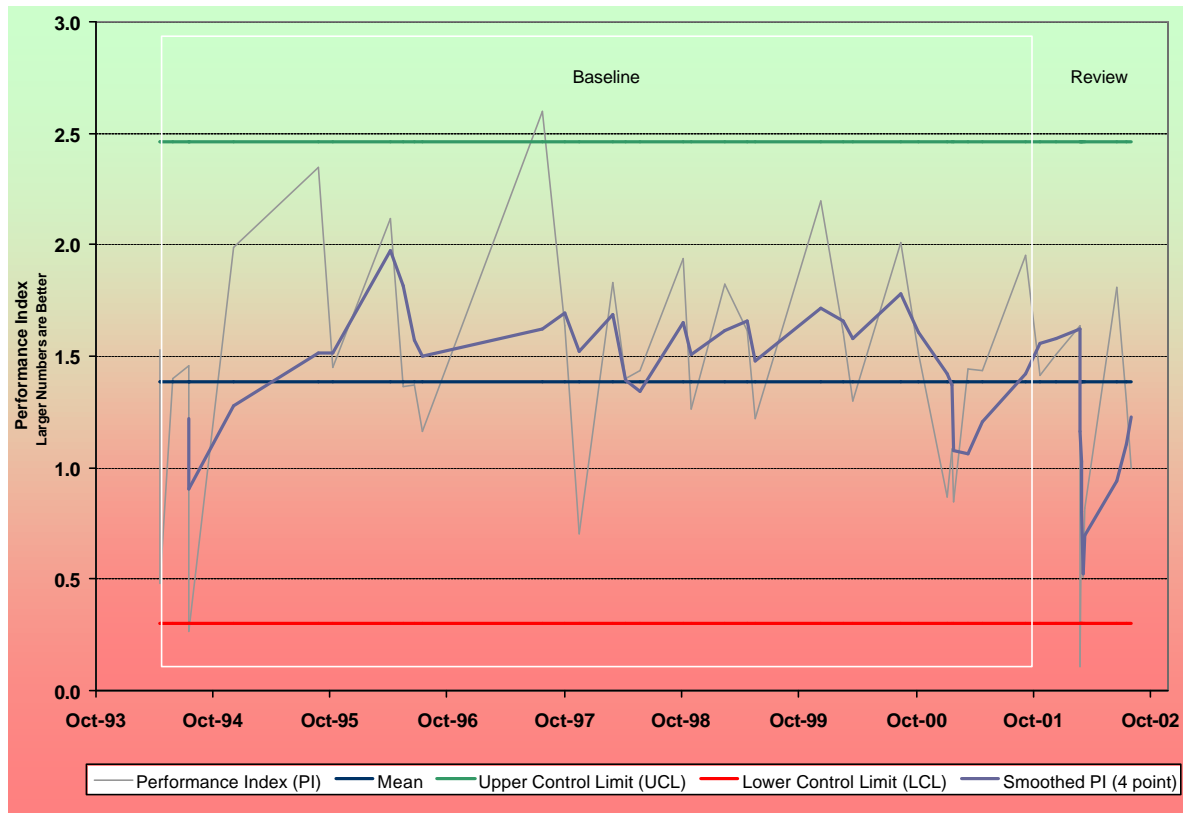
- Nearly 85% of performance surety actions involve reactive, one-time actions—equipment reviews and repairs, meetings, and stand-alone training
- No institutional actions for equipment or document reviews
- 4% of the actions involving active worker performance monitoring



Property or Equipment Occurrences

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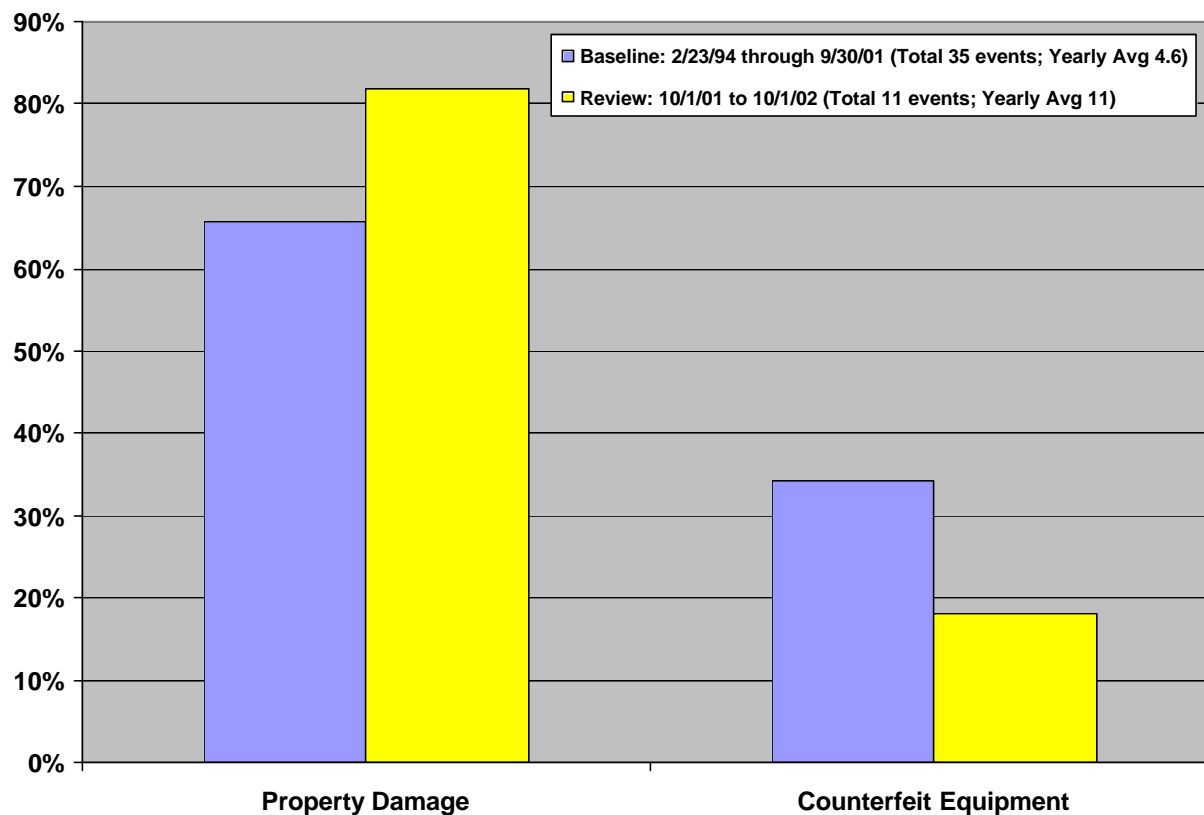
LANL Damaged or Counterfeit Property Occurrence Performance



Damaged/Counterfeit Property PI Control Chart (1/94 to 10/02)

- 46 total events severity weighted 2 or 4. No severity level 3 events.
 - Baseline: 35 events
 - Review: 11 events
- Static performance during baseline
- Declining performance for review period

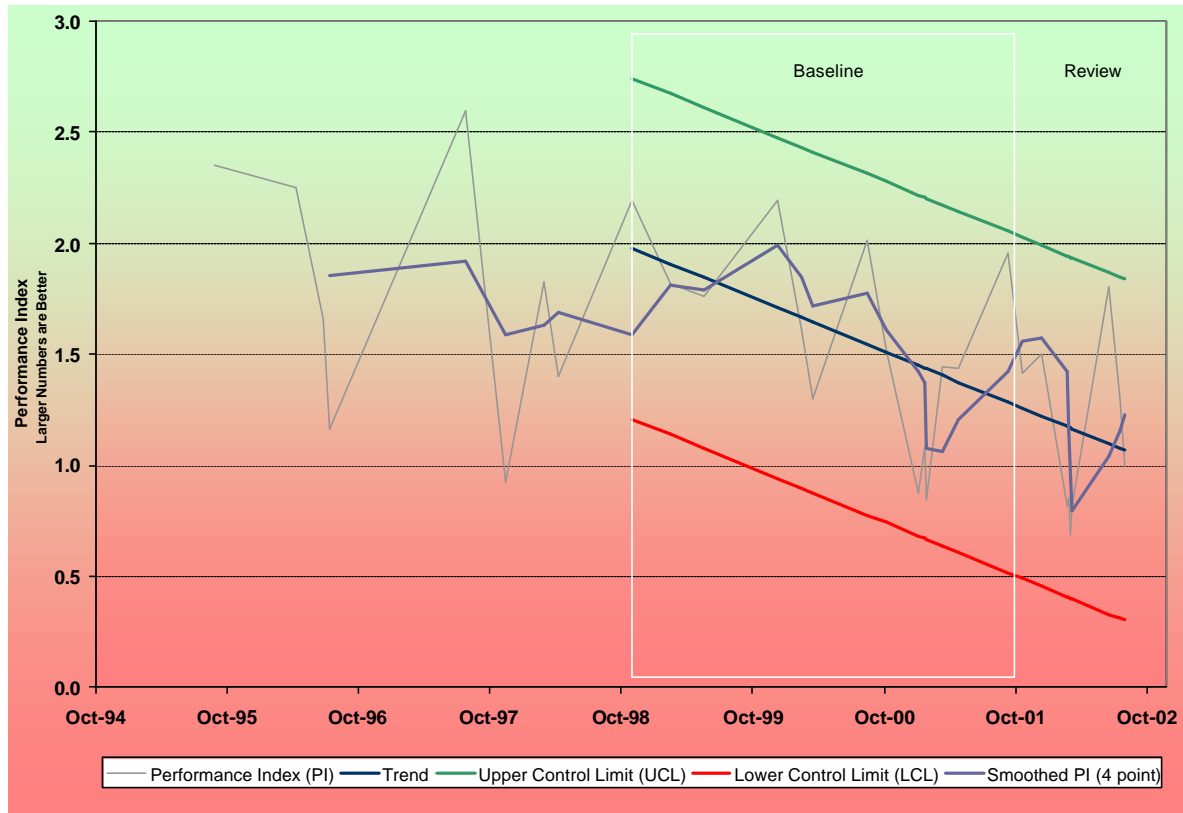
Type Distribution of LANL Damaged or Counterfeit Property Occurrences



Damaged or Counterfeit
Property Occurrences by
Type
Baseline vs. Review

- Property Damage is the predominant type—over 60% in baseline to over 80% in review
- Review to focus on Property Damage events

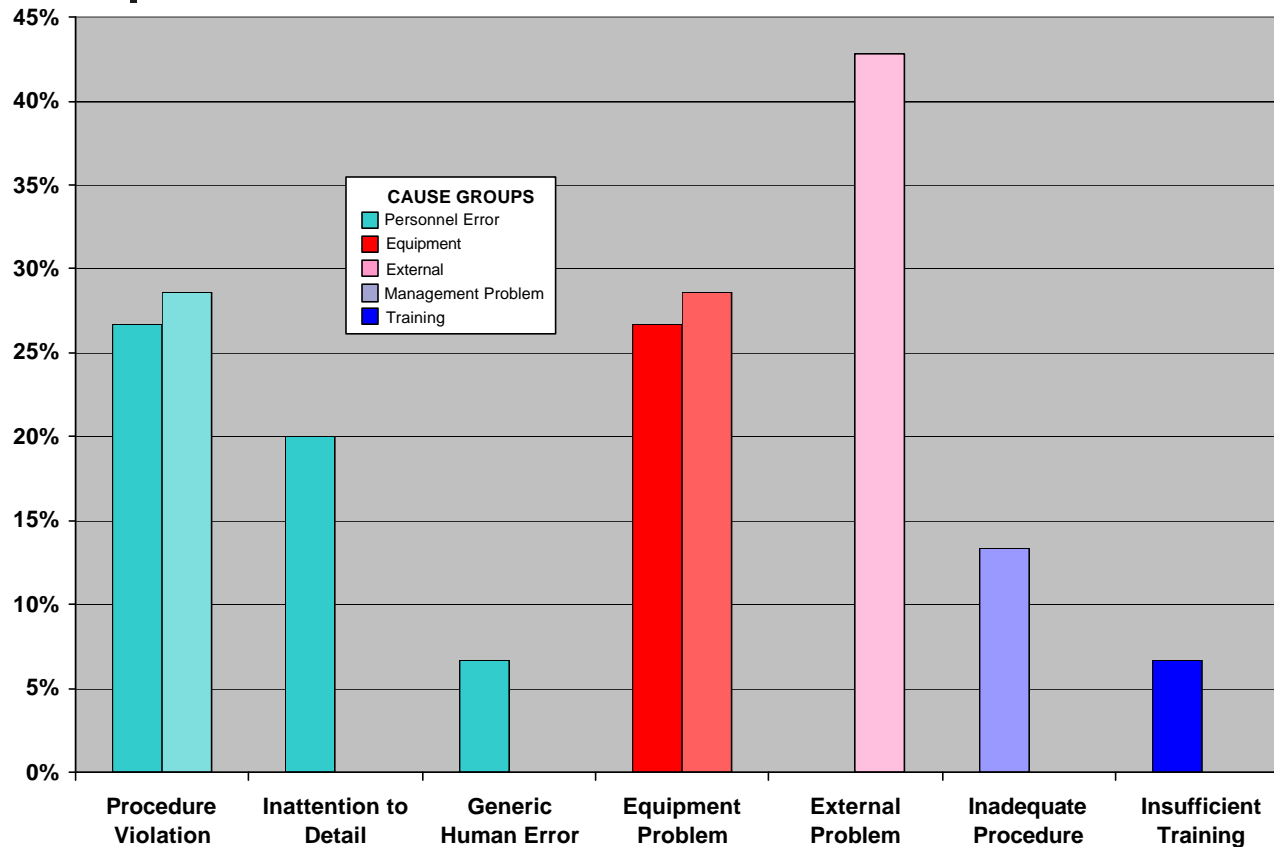
LANL Property Damage Occurrence Performance



Property Damage Control Chart
(1/94 to 10/02)

- 32 total events severity weighted 2 or 4
 - Pre-Baseline: 9 events
 - Baseline: 15 events
 - Review: 8 events
- Declining performance during baseline
- Continued declining performance for review period

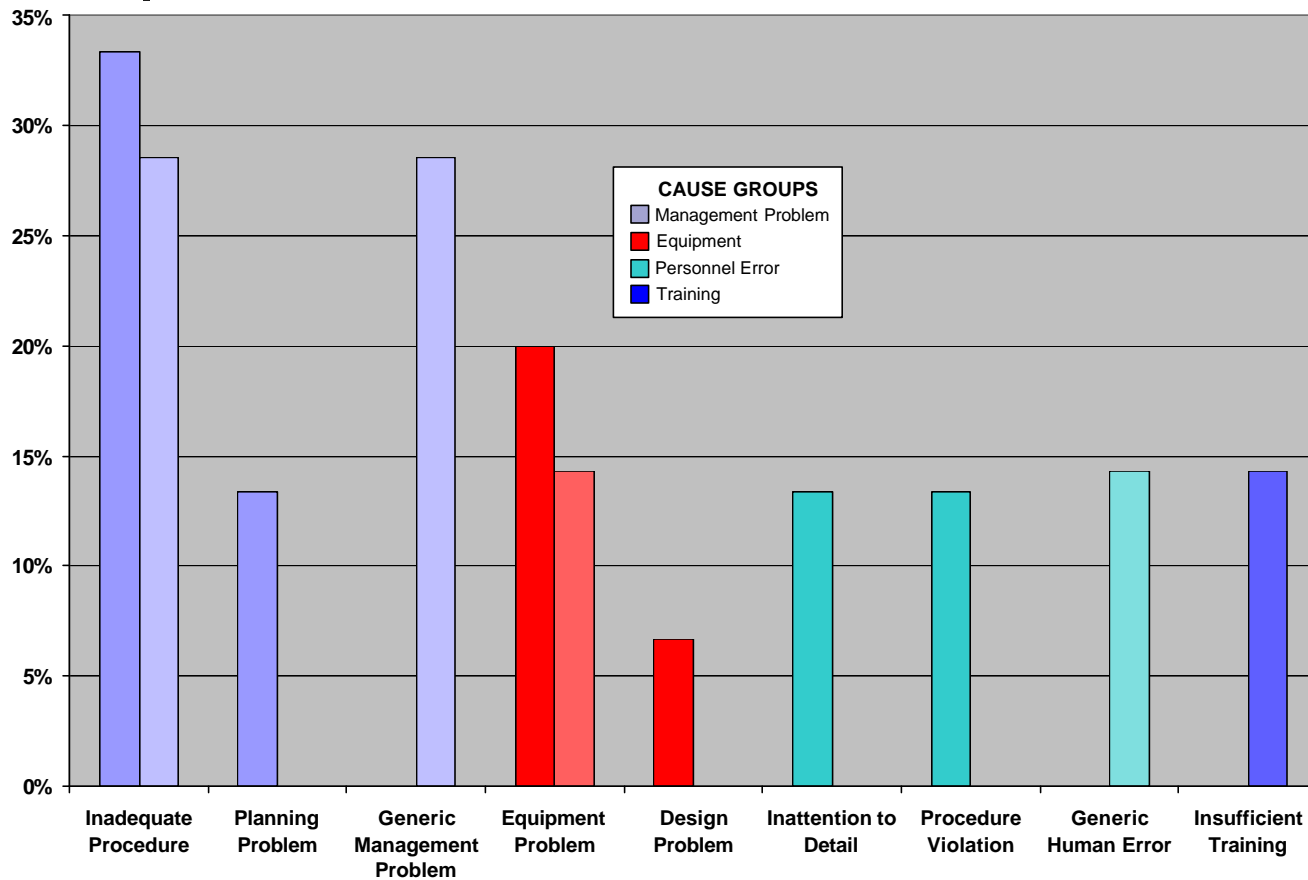
Direct Causes of LANL Property Damage Occurrences



Direct Causes Baseline vs. Review

- Personnel Error and Equipment Problems are the primary direct causes in baseline and review
- Emergence of External Problem (i.e., weather) in review period

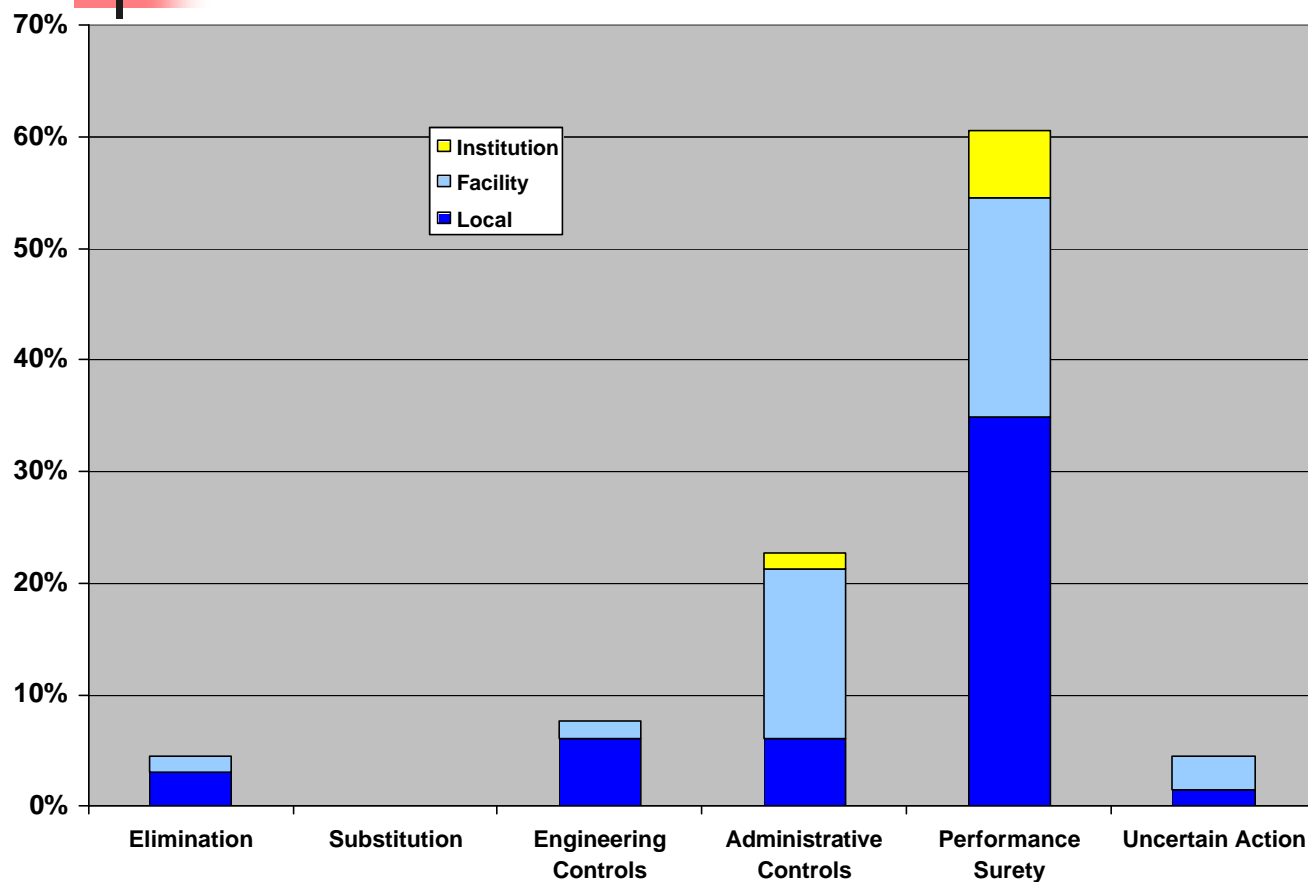
Root Causes of LANL Property Damage Occurrences



Root Causes Baseline vs. Review

- Primary root causes in baseline period are Inadequate Procedures and Equipment Problems
- Root causes in review period remain relatively consistent with baseline

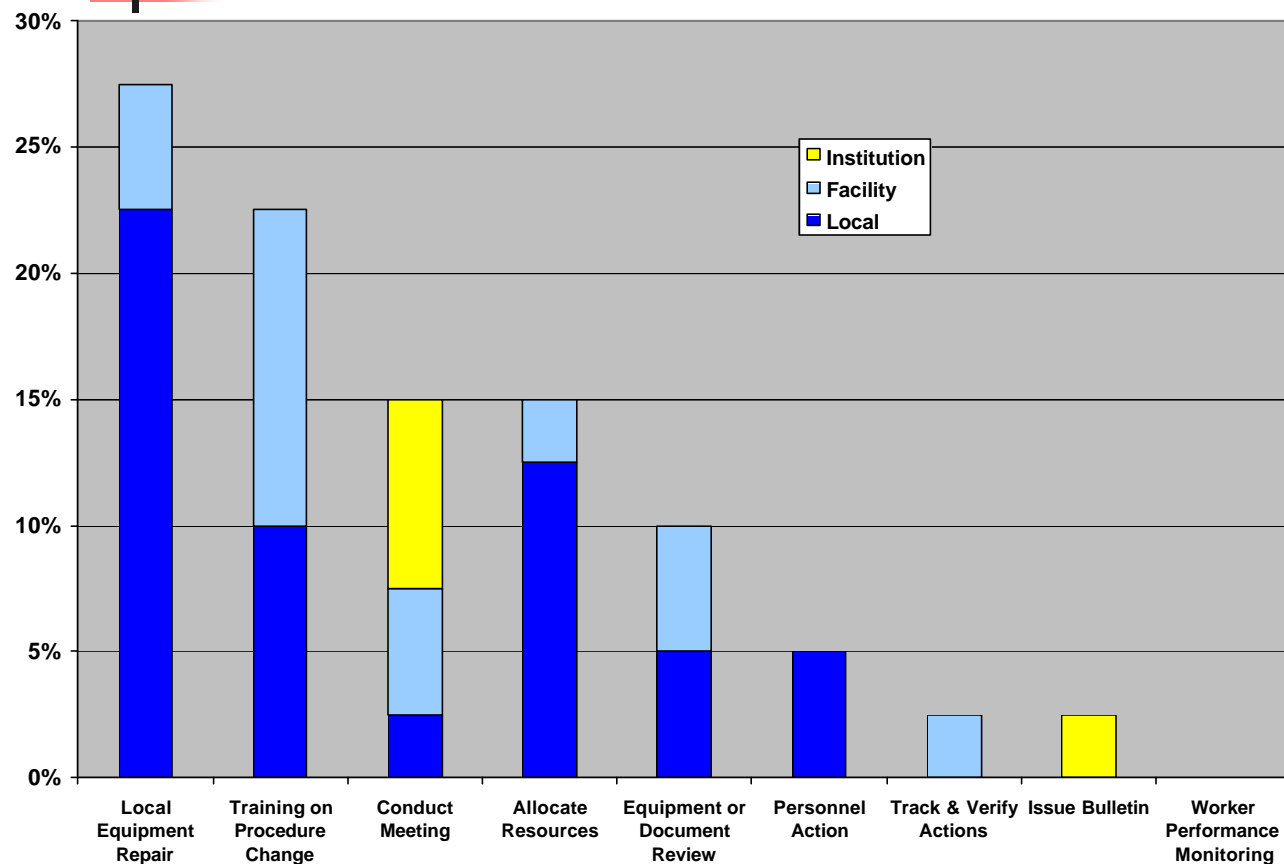
Profile of Corrective Actions for LANL Property Damage Occurrences



Corrective Actions (1/12/98 to Present)

- 84% of the corrective actions are administrative in nature—23% involve new or modified procedures with 61% being “performance surety” type actions
- Less than 8% of actions at institutional level

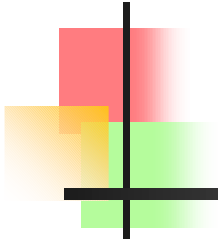
Performance Surety Actions for LANL Property Damage Occurrences



Performance Surety Actions (1/12/98 to Present)

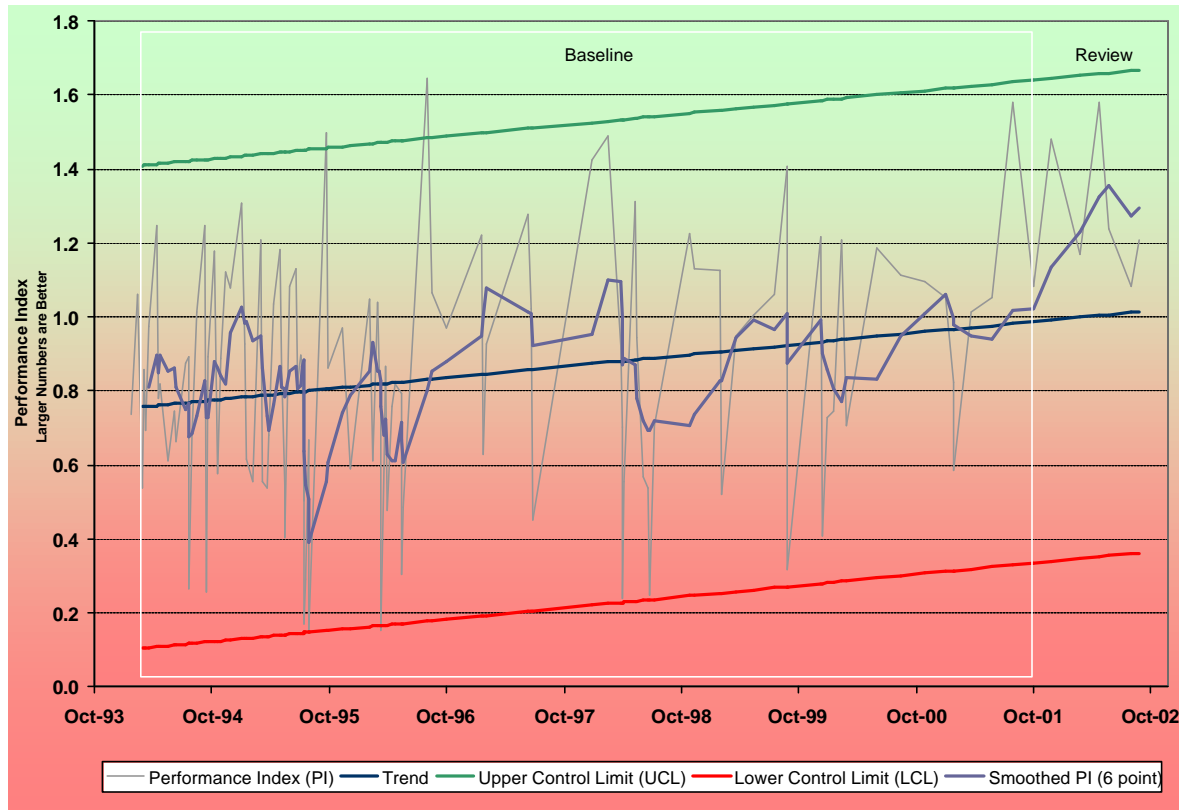
- Over 80% of performance surety actions involve reactive, one-time actions—immediate equipment repairs, single training, meetings, reviews, etc.
- No equipment or document reviews performed at institutional level

Environmental Protection Occurrences



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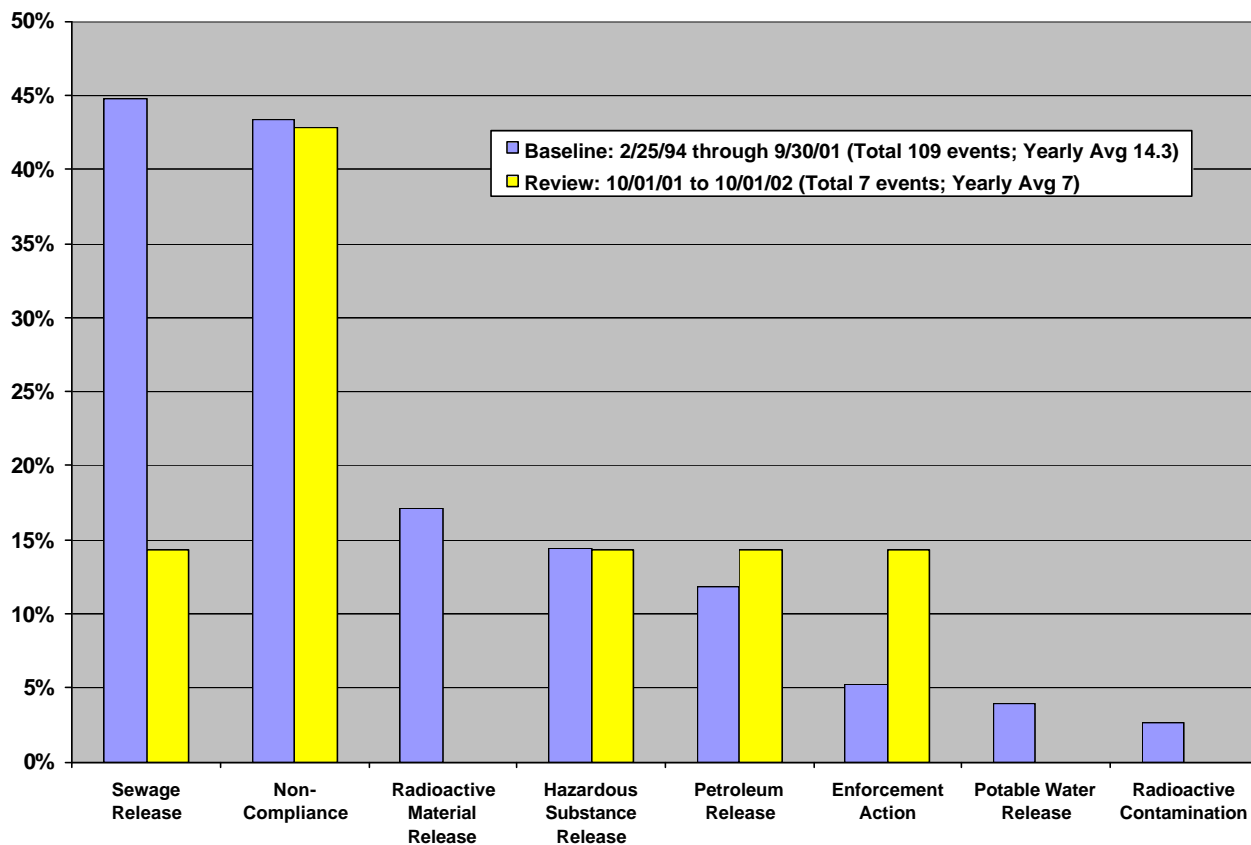
LANL Environmental Protection Occurrence Performance



Environmental Protection
PI Control Chart
(1/94 to 10/02)

- 121 total events severity weighted 2, 3, or 4
 - Baseline: 109 events
 - Review: 7 events
- Improving performance during baseline
- Improving performance for review period

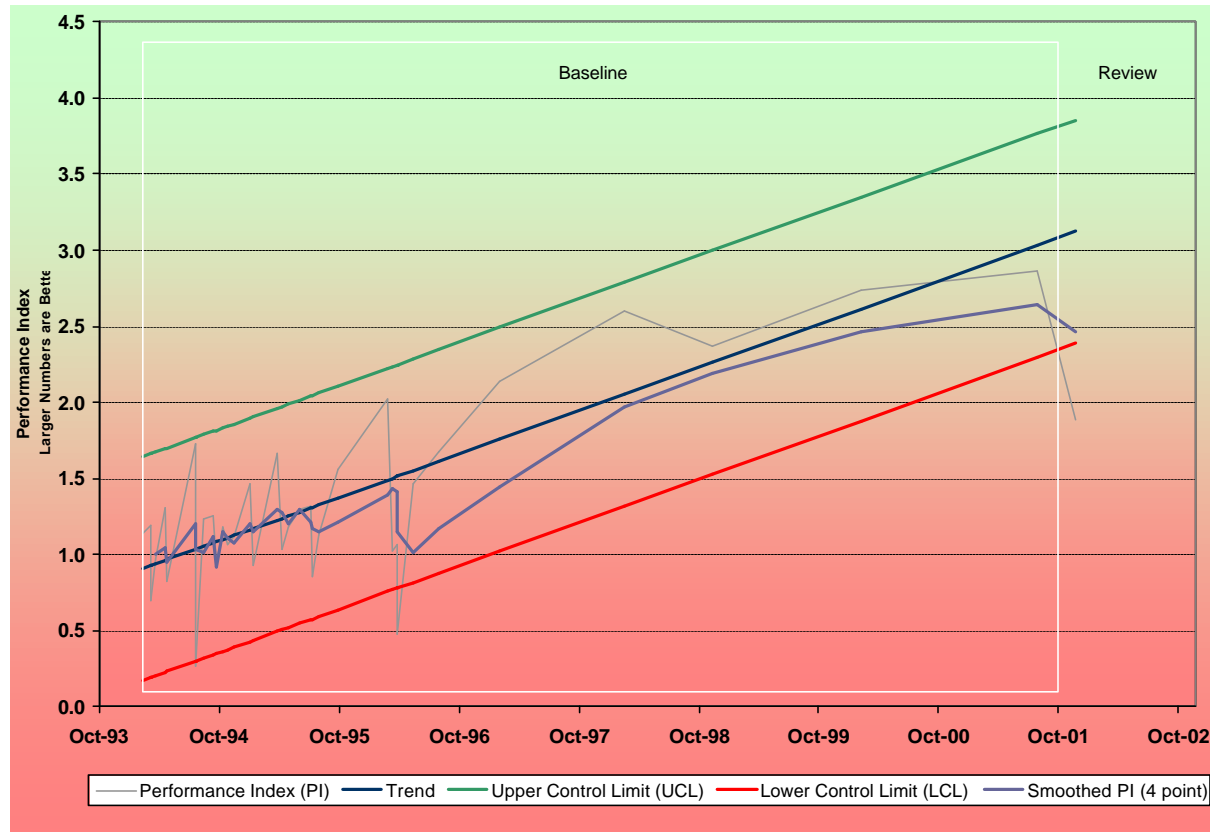
Type Distribution of LANL Environmental Protection Occurrences



Environmental Protection Occurrences by Type Baseline vs. Review

- Sewage Release and Environmental Non-Compliance are predominant types
- Significant reduction in predominant types from baseline to review periods

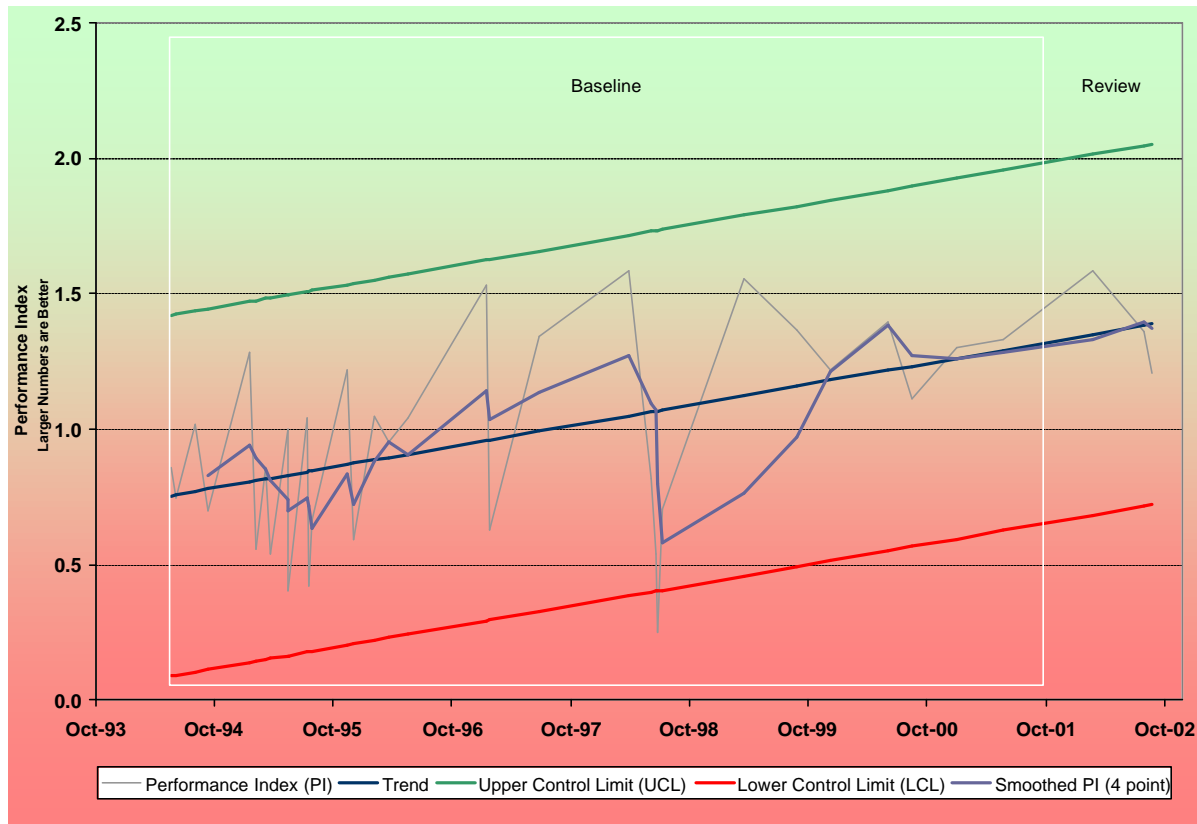
LANL Sewage Release Occurrence Performance



Sewage Release Control Chart
(1/94 to 10/02)

- 37 total events severity weighted 2. No severity level 3 or 4 events.
 - Baseline: 36 events
 - Review: 1 event
- Improving performance during baseline
- Continuing improved performance for review period—no further evaluation required

LANL Environmental Non-Compliance Occurrence Performance



Environmental Non-Compliance Control Chart (1/94 to 10/02)

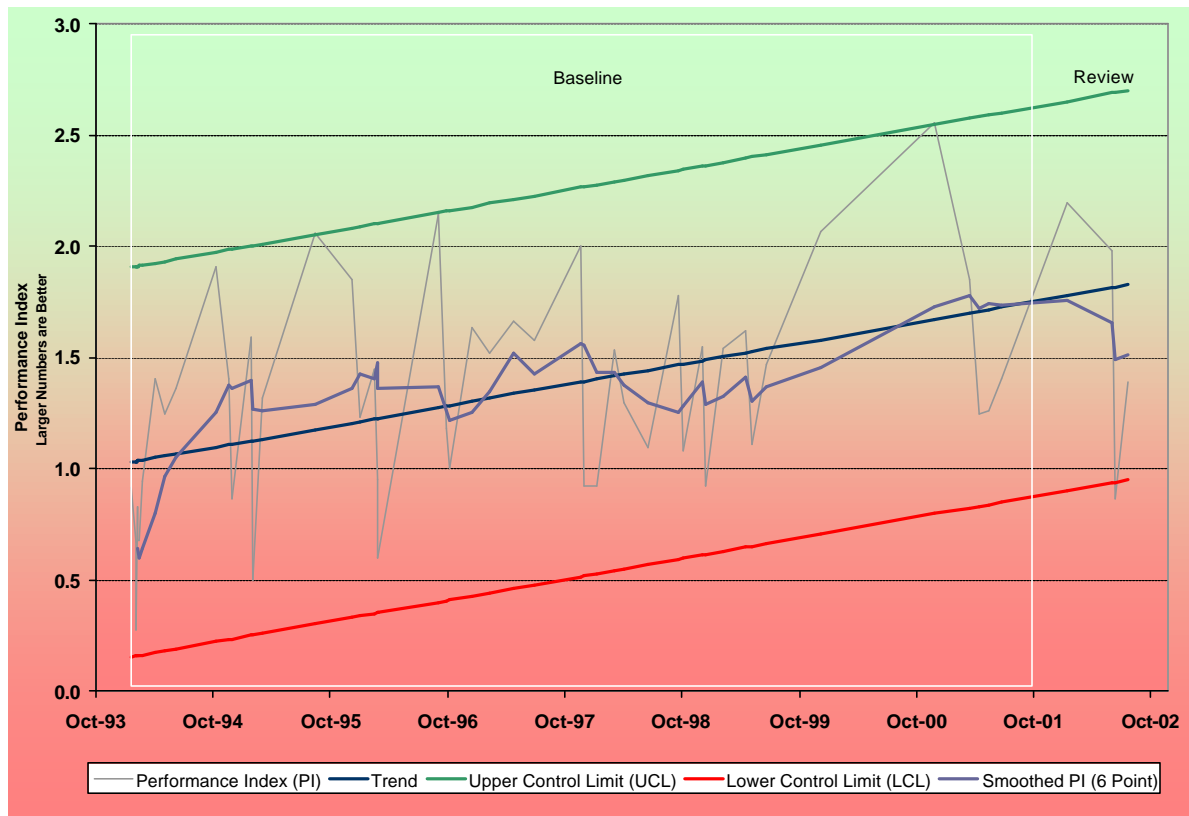
- 37 total events severity weighted 2, 3, or 4.
 - Baseline: 34 events
 - Review: 3 events
- Improving performance during baseline
- Continuing improved performance for review period—no further evaluation required



Fire Protection Occurrences

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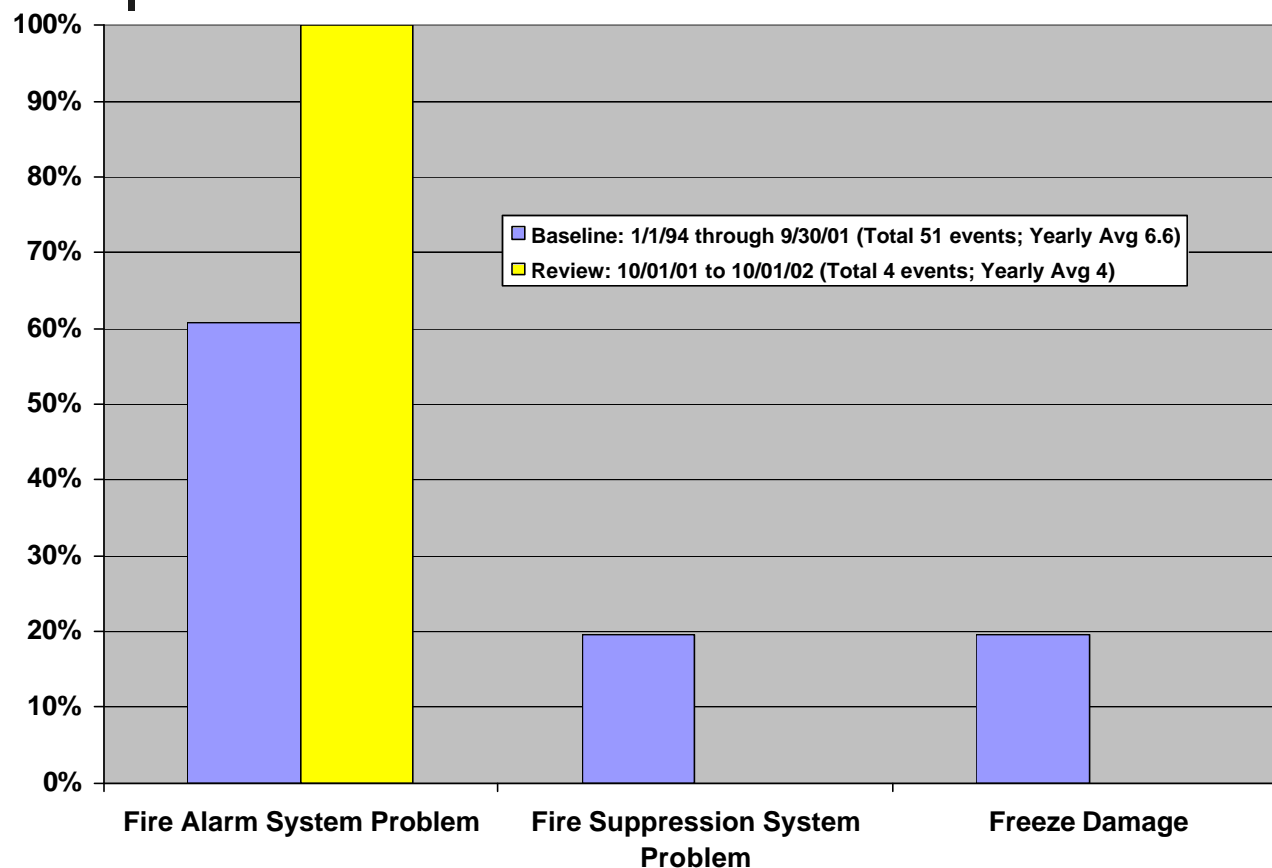
LANL Fire Protection Occurrence Performance



Fire Protection PI Control Chart
(1/94 to 10/02)

- 55 total events severity weighted 2, 3, or 4
 - Baseline: 51 events
 - Review: 4 events
- Improving performance during baseline
- Static performance for review period

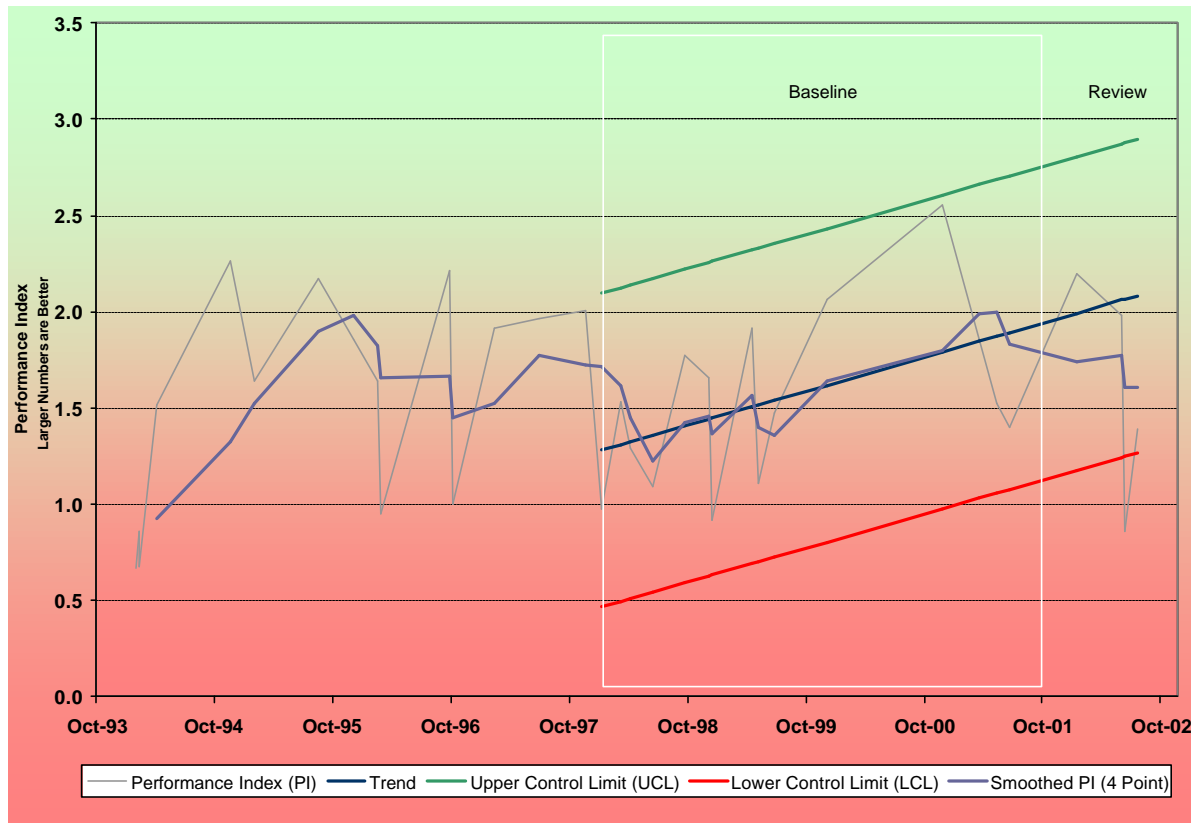
Type Distribution of LANL Fire Protection Occurrences



Fire Protection Occurrences by Type Baseline vs. Review

- Fire Alarm System Problem is the predominant type—60% in baseline to 100% in review
- Review to focus on fire alarm system problems

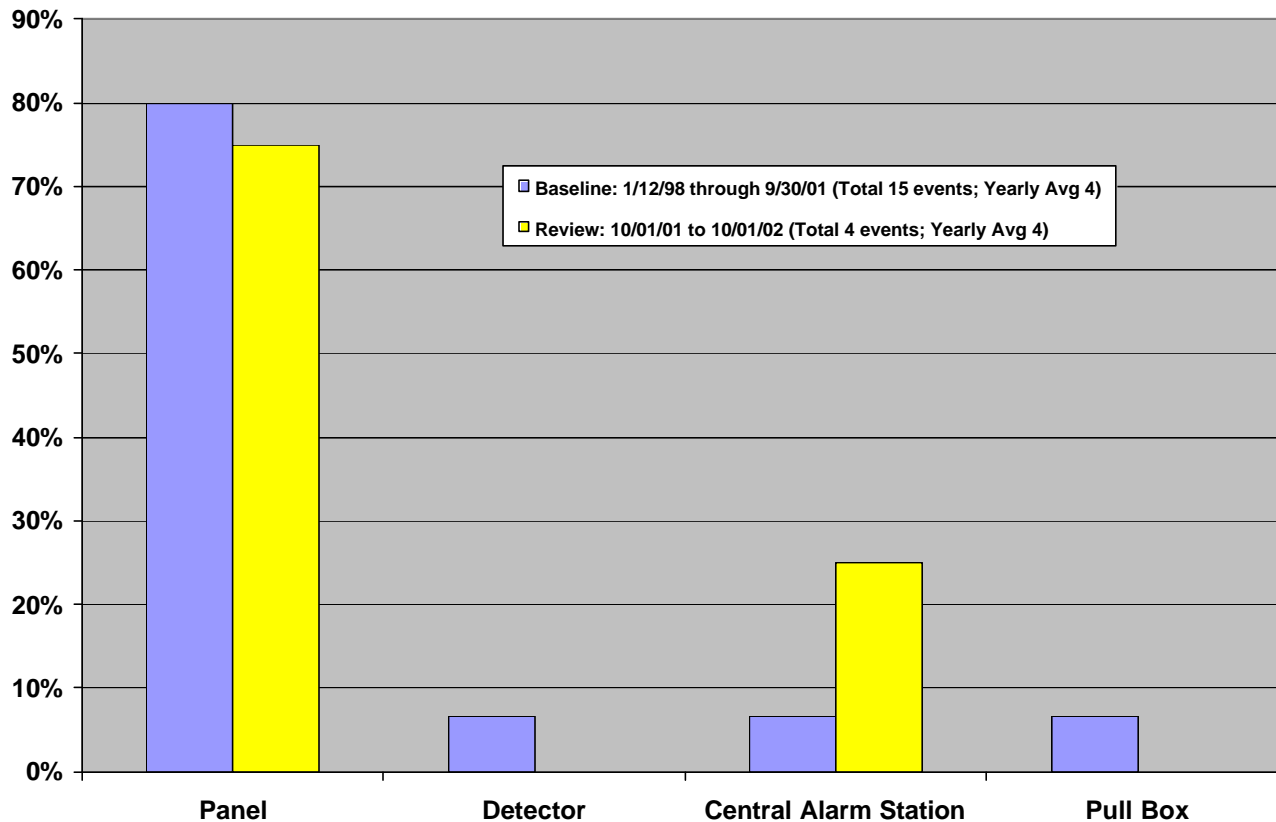
LANL Fire Alarm System Occurrence Performance



Fire Alarm System Control Chart
(1/94 to 10/02)

- 35 total events severity weighted 2, 3, or 4
 - Pre-Baseline: 16 events
 - Baseline: 15 events
 - Review: 4 events
- Improving performance during baseline
- Static performance for review period

Sub-Type Distribution of LANL Fire Alarm System Occurrences

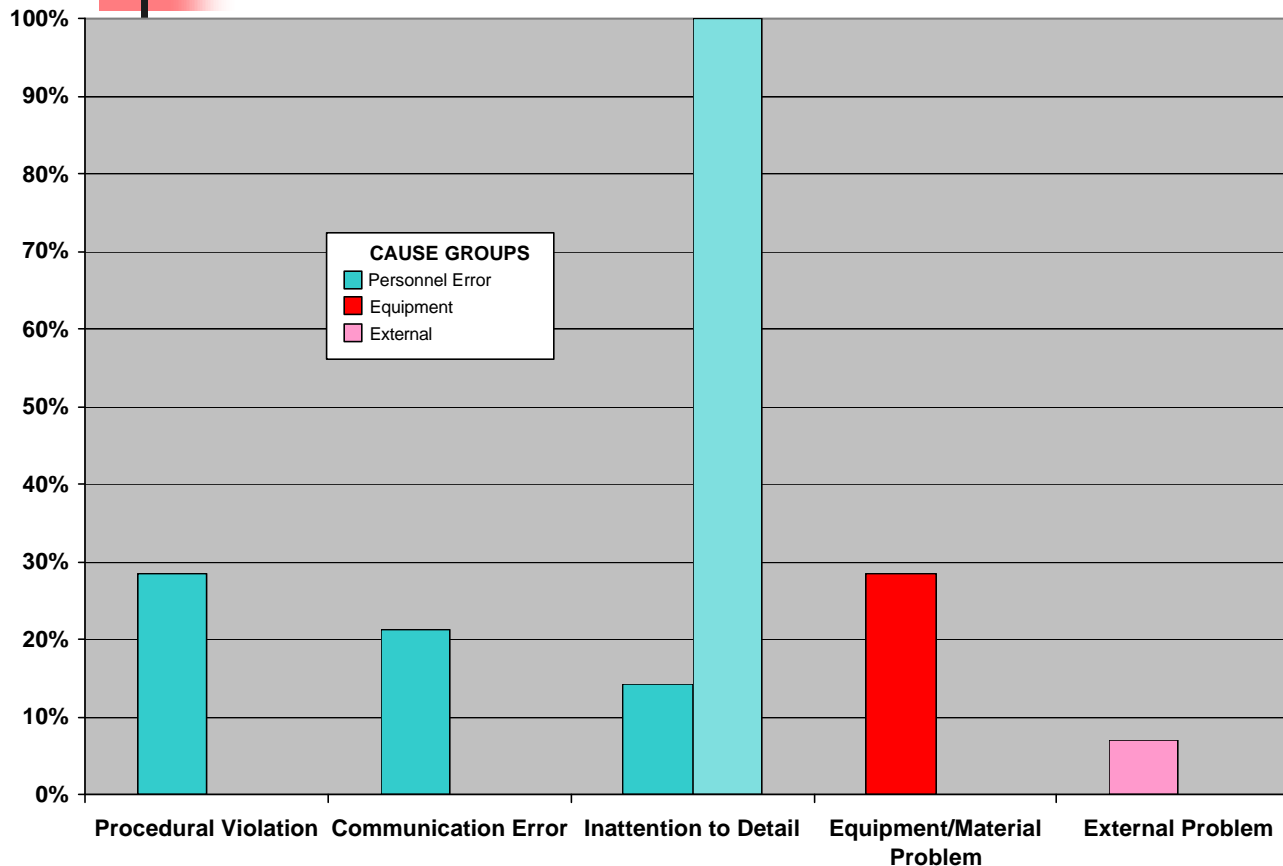


Fire Alarm System Occurrences by Sub-Type

Baseline vs. Review

- Fire Alarm Panel Problems is the predominant subtype—more than 75% in baseline and review
- Focus on causes and actions related to fire alarm panel problems

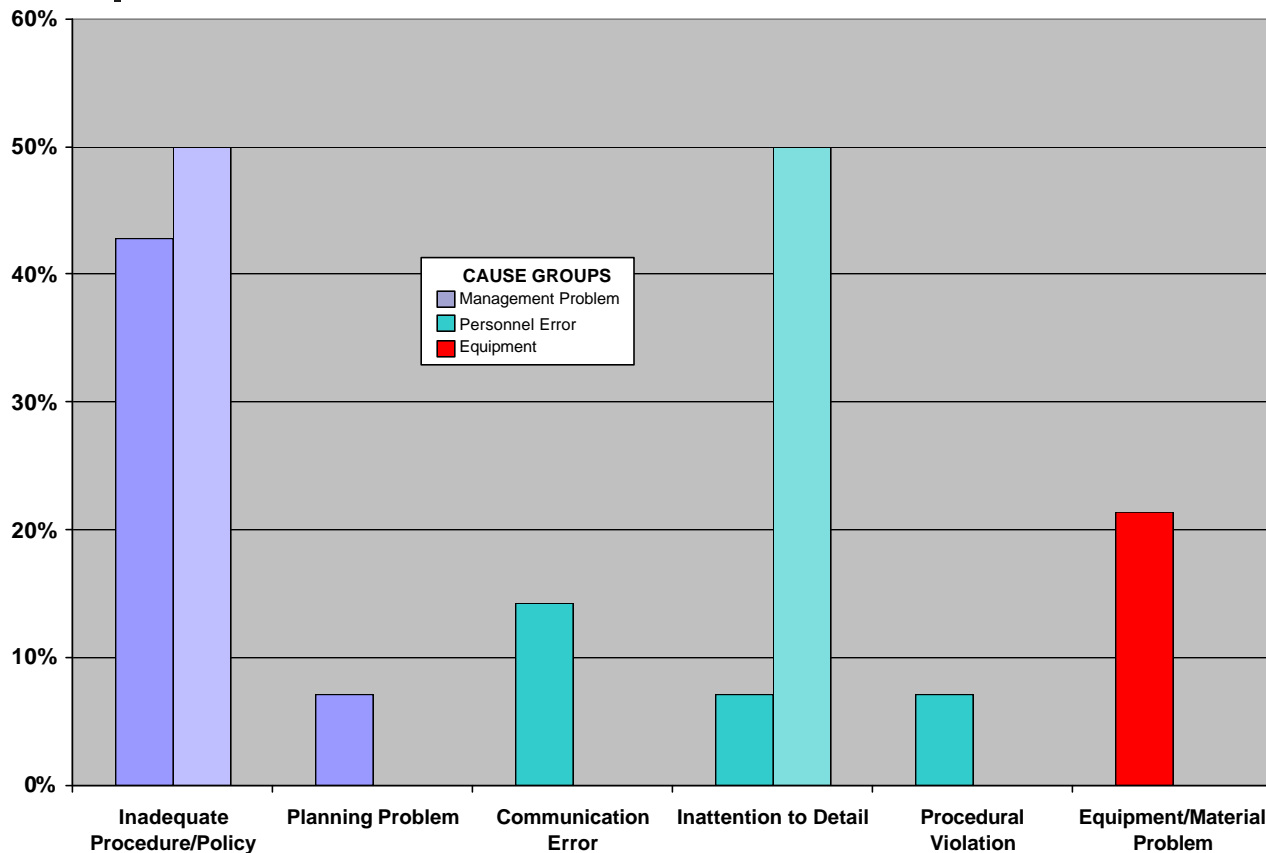
Direct Causes of LANL Fire Alarm Panel Occurrences



Direct Causes Baseline vs. Review

- Personnel Error is the primary direct cause group in over 60% of events involving fire alarm panel problems
- Equipment problems is the second leading direct cause group

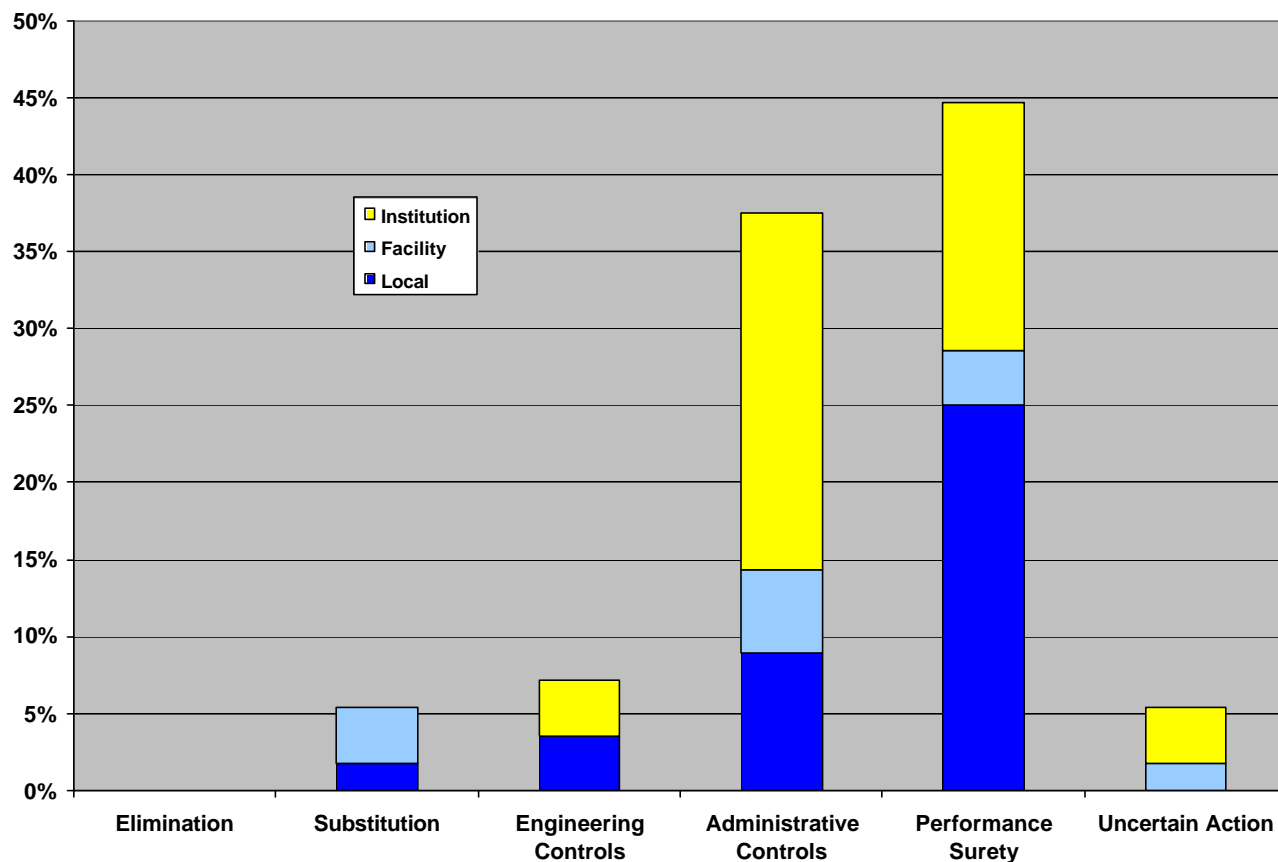
Root Causes of LANL Fire Alarm Panel Occurrences



Root Causes Baseline vs. Review

- Primary root cause is inadequate procedures or policies—over 40% in baseline and review periods
- Personnel Errors and Equipment Problem are secondary root causes

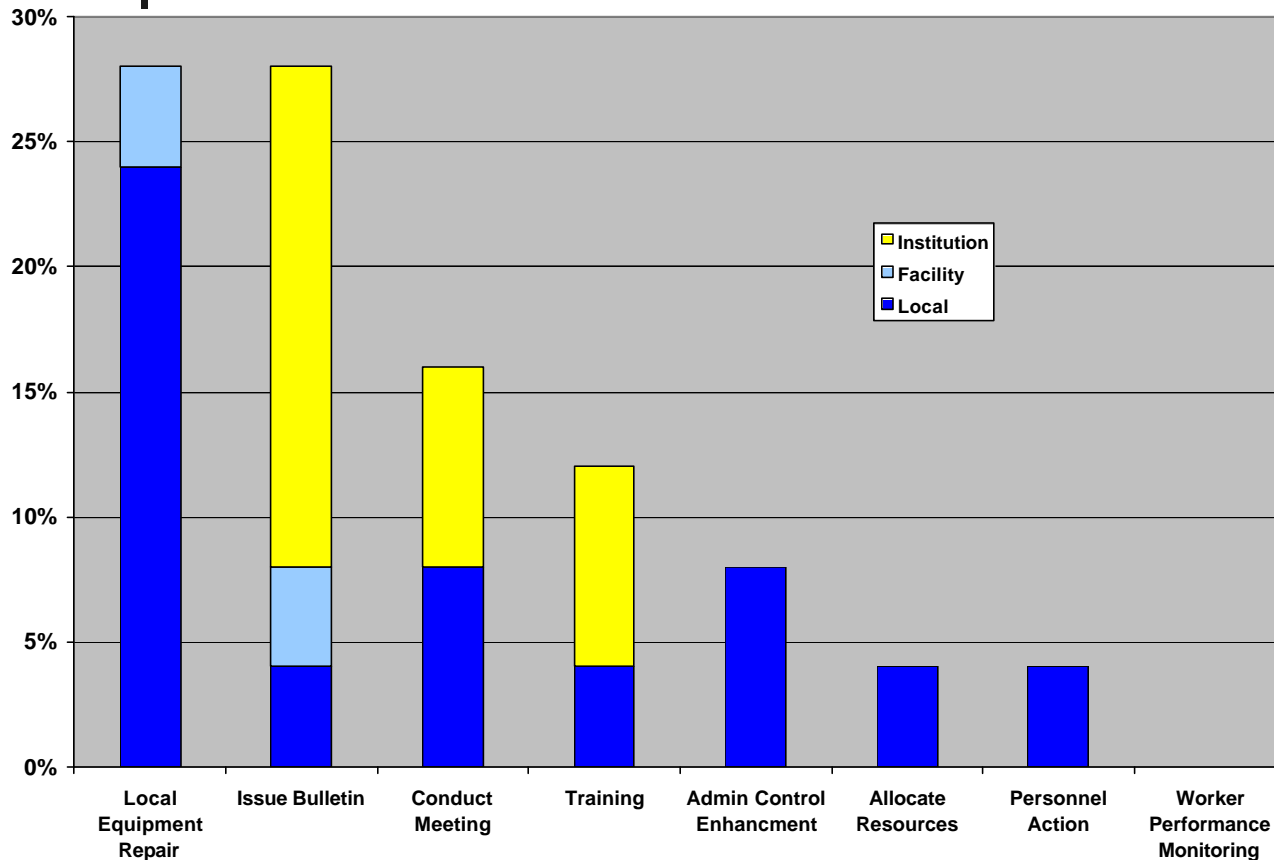
Profile of Corrective Actions for LANL Fire Alarm Panel Occurrences



Corrective Actions (1/12/98 to Present)

- Over 80% of the corrective actions are administrative in nature—34% involve new or modified procedures with 56% being “performance surety” type actions
- 46% of actions at institutional level

Performance Surety Actions for LANL Fire Alarm Panel Occurrences



Performance Surety Actions (1/12/98 to Present)

- Nearly 90% of performance surety actions involve reactive, one-time actions—immediate equipment repairs, meetings, bulletins, single training, etc.
- No actions involving active worker performance monitoring